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Number 1



South Dakota **medicine**

THE JOURNAL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION

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RUNNING TO RETIREMENT

ROSS POLKING, CFP®, AIF®, MBA *Lead Advisor - Business Development*

Lots of people run for exercise. Others only run when a dog is chasing them. For a small number of high school runners, cross country season wrapped up in late October. It's such an amazing and surprisingly fun sport to watch. What makes the viewing experience extra special (and humbling) is the effort and pain these kids willingly to endure as they compete for team championships. Many are running more miles at faster times than most humans ever will.

The season ultimately culminates at the state meet which delivers almost equal doses of joy and heartache largely dependent on months of preparation and race-day strategy. Coaches play a critical role in setting the approach their runners follow. A common theme I hear from successful coaches is, "The first mile at state is never where races and medals are won, but often where they are lost." Said another way, trying to get out too fast and take unnecessary risk can cause a runner to implode later on the course and fall short of goals.

Similar fates may await investors who try to get out too fast, take undue risk, ignore their coach, and lack any plan beyond trying to hang on. Aiming to pick hot stocks and quickly grow a portfolio exponentially might work for some but not for most. The higher probability of success tends to come from planning ahead and accounting for the inevitable ups and downs in life and the market.

Diversifying investments, in the event that a portion of your holdings stumble, may keep you from capitulating and collapsing. Runners face the same inherent obstacles on the course and require a plan that goes beyond just sprinting for as long as they can. In both cases, going too fast too quickly is an almost surefire recipe for complete collapse.

Stay diversified, and stay the course. That's good advice for both runners and investors. If you want a financial coach to help you with this, just holler.



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SDSMA Advocacy Accomplishments

Lucio N. Margallo II, MD

President, South Dakota State Medical Association

During my induction as the 141st president of the South Dakota State Medical Association (SDSMA) last June, I took an oath to work closely with the Board of Directors, Policy Council, and staff of our organization to carry out my duties and responsibilities attached to the office. These duties are: set directives for the association's strategic planning, set its vision and mission honoring our organizational values, promote positive public image, help ensure adequate financial resources, assure legal responsibilities, and help provide ethical oversight. With the cooperation of the SDSMA members and leadership, and ongoing collaboration with the American Medical Association, we have achieved solid accomplishments and continue to gain strong support for our advocacy.

SDSMA supported the Medicaid expansion ballot measure which was approved by voters in the November 2022 election. This result expands Medicaid eligibility to people ages 14-64 whose income is at or below 133 percent of the federal poverty level, plus 5 percent of applicable family size. An additional 42,500 South Dakotans will benefit from this expansion.

SDSMA successfully advocated for rules limiting three cannabis plants per household, limiting THC levels to less than 15 percent, and granting physician access to the patient registry of those certified for medical marijuana use. Additionally, we supported the successful defeat of the statewide ballot measure that would have legalized recreational marijuana.

SDSMA introduced the South Dakota Coalition for Excellence in Patient Care to preserve physician-led healthcare teams and stop inappropriate scope of practice expansions that threaten patients' safety. SDSMA works to ensure access to high quality healthcare and medical education and strongly supports increasing funding to support graduate medical education.

SDSMA supports physicians and patient autonomy in the provision of evidence based medical services, which includes reproductive healthcare, and will oppose attempts that infringe upon the patient-physician relationship. It opposes excessive provisions that do not have proper medical justifications creating administrative burdens that cause delays for appropriate care. We further support physicians through the South Dakota Physician Well-Being Program, which was started to help reduce burnout and improve physician wellness.

SDSMA places high importance on preventive medicine by raising awareness about the harmful effects of tobacco, e-cigarettes, substance abuse, obesity, gun violence, and bringing attention to suicide prevention by advocating for improved access and third-party coverage of mental health services. The SDSMA supports funding, education, and state requirements for immunizations and opposes exemptions.

There is much left to be done. Working together, our association can accomplish great things. I look forward to continuing the fine work of my predecessors and leading this association through challenging and consequential times.

The Physician We Set Out to Become

Kaleb Dobbs, MS I; Mollie Heinen, MS I; Heidi Bien, MS I; and Logan Stacey, MS I

The first year (Pillar 1) students at USD Sanford School of Medicine recently completed a lecture series about the ethical issues and professional concerns that confront today's physicians. At the conclusion of this series, the students were challenged to collaborate on an essay that describes the type of physician they hope to become.

Jerome W. Freeman, MD and Ann Cook, PhD

For each of us, the decision to pursue a career in medicine was rooted in an early interest in the natural sciences and a genuine love of learning. This curiosity was further supported by positive experiences shadowing physicians, personal ties to medicine, and a desire to help others. These experiences, interests, and values culminated in our pursuit of and acceptance into medical school — a fact that still seems surreal at times. So, at this point, when asked why we want to become physicians, the answer is easy. A more challenging question is who we want to become as physicians. Of course, we are all striving to grow into competent and capable physicians in our practices, but competency is only a small fraction of what enables a physician to excel. While we are just first year medical students, we are already beginning to create an image of the physicians we want to be, latching onto admired traits seen in our role models and interweaving these with our own values and goals as individuals. We hope to be team players, advocates, and above all else compassionate and caring individuals. We wish to make our patients and their needs a priority in an ever-changing healthcare system.

As physicians, we hope to use our knowledge of medicine to not only establish comprehensive care but to facilitate meaningful and compassionate relationships with our patients. While patients often appreciate a physician who can tell them their exact diagnosis, rarely is it what patients remember most. Rather, patients hold onto how they are treated. We hope to see each patient as a unique and complex individual, not a collection of symptoms needing to be diagnosed, but as someone who has placed confidence in us to guide them through a troubling time. Our goal will be to sit down with patients and have a conversation — about their health, their job, their life. Perhaps, the relationship will be built not based on a diagnosis but what can we do to help patients meet their needs and expectations. Our hope is to empower our patients with options and to support their autonomy to decide how they want to proceed with their care.

While we don't have experience as physicians yet, we have all been patients. These times of being sick or injured were

certainly not our happiest days. We recall going to a clinic in search of answers, hoping that someone could make things better. In these moments, even as aspiring physicians, we didn't really care why one specific treatment worked over another. It was important to each of us that our physician was a good listener and treated us as an important individual. With patient priorities being challenged by time constraints and overburdened schedules, the task of creating unique space for each patient remains an ongoing challenge. In learning how to be on the other side of the physician-patient relationship, we hope to never lose sight of how we, or our loved ones, would want to be treated.

As future physicians, we recognize that we will not be the only ones to care for our patients. It will take the collaboration of a team to provide quality healthcare. And as we recognize the obligation to care for our future patients, we also want to support our fellow healthcare team members by creating a collaborative and supportive work environment. We want to prioritize forming a work environment where everyone can hold each other accountable to be at their best every day. This will include treating each member with dignity and respect, while also having the humility to acknowledge we won't have all the answers and will need to turn to others for help. We understand it will require resilience to remain positive and to afford a shoulder for our colleagues to lean upon. We aspire to use our position as physicians to create space for accountability and growth within the healthcare team.

As the next generation of physicians, we know we will influence the future of medicine. Our role is to be good listeners, advocates, problem solvers, and professionals who are respected as well as respectful. We are committed to maintain the humanness in medicine. We see value in articulating the type of physician we hope to become and we are motivated to work hard to never lose our way.

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State of South Dakota's Child: 2022

Ann L. Wilson, PhD; Tyler A. Hemmingson, MPH; and Brad Randall, MD

Warmest greetings I extend to you as 2023 begins.

This annual article provides updates on the status of our state's youngest citizens. We welcomed 11,304 babies as residents of the state during the pandemic year of 2021. Sadly, not all survived their first year of life. The pandemic has reminded us all that we live in an inter-connected world. Each of us has a vital role to play as we do our best to protect our neighbors while caring for patients with an understanding of the challenges we all face to assure our health and wellbeing.

Thank you all for what you do to assure the very best for new life and the families and communities that care for it.

Tim M. Ridgway, MD, FACP, FASGE

Dean, University of South Dakota Sanford School of Medicine

Vice President for Health Affairs

Abstract

In 2021, South Dakota observed an increase in the number of births from 2020 when the state experienced its lowest historic birth rate. Nonetheless, this increase represented a 3.7 percent decrease from the state's previous five year (2016-2020) mean of live births. This growth in the 2021 cohort of newborns was seen almost entirely among its white population. Further, South Dakota's current rate of birth remains slightly higher than that observed nationally. Over recent years, the racial diversity of South Dakota's newborns became similar to that observed nation-wide with nearly one quarter being American Indian, Black or Other races (AIBO). This trended down in 2021 with 22 percent of the state's newborns AIBO. Further, in South Dakota, the percent of all AIBO newborns who are American Indian is decreasing. Currently, 60 percent of the AIBO population is American Indian compared to more than 90 percent in 1980. During the pandemic years of 2020 and 2021, racial disparities in perinatal outcome occurring during previous years continued to be observed but the onset of prenatal care in the first trimester for both white or AIBO pregnant women did not change. There were 71 infant deaths in 2021 yielding a decrease in South Dakota's infant mortality rate (IMR) from 7.4 to 6.3 (higher than the 5.4 IMR for 2020 for the U.S.). Though there was a decrease in the state's 2021 IMR to 6.3, the reduced rate from its previous five year mean of 6.5 is not statistically significant. The state's 2021 neonatal mortality rate (NMR = 0 to 27 days per 1,000 live births) and post neonatal mortality rate (PNMR=28 to 364 days per 1,000 live births) dropped for the white population and increased for the AIBO population, though the actual number of AIBO deaths associated with these rate increases were low. Between 2017-2021, the South Dakota rates of death for AIBO compared to white newborns was significantly higher for perinatal causes, sudden unexpected death (SUID), and other causes. Compared to the U.S.' 2020 rates of infant mortality, South Dakota's comparable 2017-21 rates were significantly higher for congenital anomalies (1.1 versus 1.8; $p<.01$) and SUID (0.9 versus 1.5; $p<.05$). In 2021 there were 15 deaths in the state due to SUID; a decrease from the previous year, yet little overall improvement in decreasing the rate of this cause of death has not been achieved. Between 2017 and 2021, SUIDs comprised 22 percent of infant deaths for both white and AIBO infants. A discussion of strategies to prevent these persisting tragedies is presented.

Introduction

The year 2021 may offer an understanding of the potential impact of the pandemic on perinatal outcomes. In mid-March 2020, many facets of communities shut down and citizens began to be home-bound to avoid exposure to the virus. The availability of immunizations began by the end of 2020 and the beginning of 2021 and gradually sheltering-in-place was replaced with guarded social mingling. This report examines annual data on births and infant deaths and this year will consider how the pandemic may have affected the first year of life for babies born during this time.

Natality

The year 2020 brought to South Dakota a 4.3 percent decline in births from its previous year.¹ This decline was reversed in 2021 with a 3 percent increase in the number of arrivals of new babies to the state.² Nonetheless, the 11,304 live births in 2021 represented a 3.7 percent decrease in the previous five year (2016-2020) mean number of South Dakota live births. Figure 1 presents these observations. To be noted is that some babies born in 2021 were conceived during the later parts of 2020 when home-bound life was common.

Figure 1. Live births, South Dakota, 1965-2021.



A look at the residence of new babies arriving in South Dakota shows that 39 percent became residents of Minnehaha and Pennington counties. Further, 72 percent of the increase in live births between 2020 and 2021 occurred in these two counties.

Figure 2 shows the 2020 decline in births was also expressed in the state's lowest birth rate (12.3) since 1910.¹ This figure also shows how the state's birth rate in recent years has consistently been higher than that of the U.S., yet both the state's and country's downward slope in birth rates has aroused national interest. The increase in U.S. births in 2021 was noted with news releases from the CDC that reported that "births rose for the first time in seven years."³ This increase in South Dakota's births was the first observed

Figure 2. Birth rates, South Dakota and United States, 1910-2021.

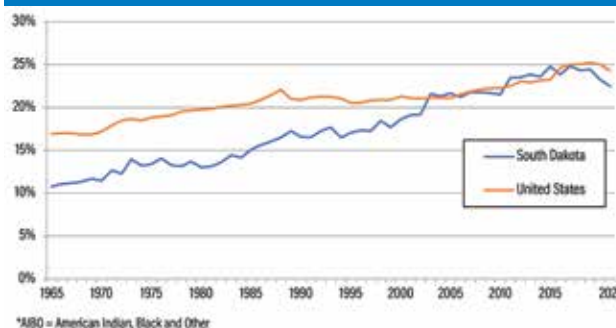


in five years.^{1,2} Again, time will tell if these observations will be sustained.

In an effort to optimize respect for all racial and ethnic populations of the state and country, yet also to be as responsive as possible to the challenges of presenting data from small sample sizes, the term AIBO will be used throughout this publication to describe American Indians, Blacks and Other (Asians and multi-racial/non-Hispanics). In previous publications of this article, the term "minority" was used to describe the combination of these racial groups. The term "white" will continue to be used, as in previous publications, to describe all Caucasians and those of Hispanic origins. Until recently, state data combined these two groups and thus for the sake of continuity of graphs that provide longitudinal data, the numbers representing whites and Hispanics will continue to be combined.

Figure 3 illustrates how the racial diversity of the state has increased over time and compares it to national observations. In 2021, 22 percent of all newborns in South Dakota represented the AIBO populations and this is less than the 24 percent observed nationally.^{2,4} Figure 3 also shows national and South Dakota natality data from 2021 compared to 2020. There was a slight decrease in the percent of AIBO newborns both nationally and in South Dakota. Specifically, there was

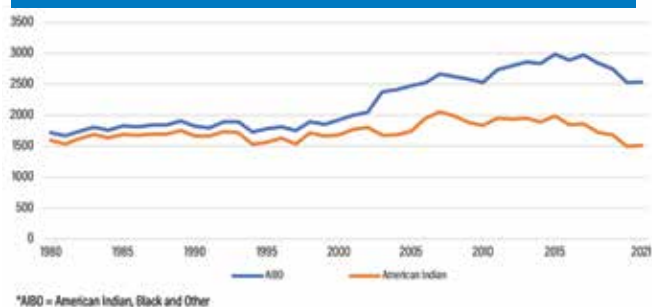
Figure 3. Percent of AIBO* live births, South Dakota and United States, 1965-2021.



only one more AIBO newborn (n=2,536) in 2021 than in 2020 with the growth of the total number of newborns observed in Figure 1 accounted for only by an increase in the state's births occurring among white newborns.²

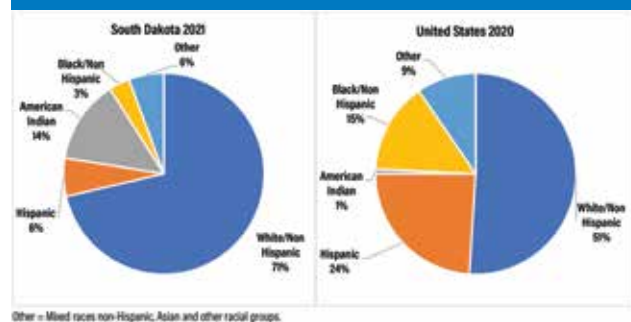
To examine the shifting composition of the AIBO population in South Dakota, Figure 4 displays how American Indians are decreasing in their representation among this group. In 1980, almost all (93 percent) newborns in the AIBO group were American Indians. In 2021, this percent has diminished with American Indians representing 60 percent of all AIBO newborns born in the state in 2021.²

Figure 4. AIBO* and American Indian live births, South Dakota, 1980-2021.



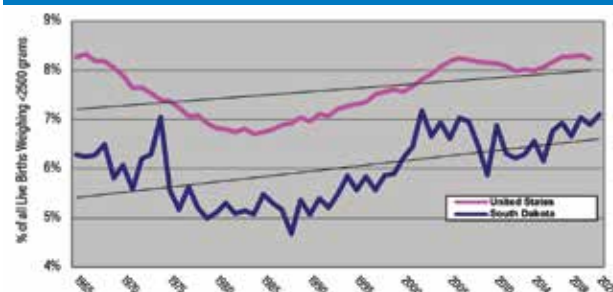
The pie charts presented in Figure 5 further describe the total current cohorts of newborns in South Dakota and the U.S. These data break down the AIBO and white populations into subsets representing cohorts of newborns.^{2,5} Very apparent in this figure is how the percent of white non-Hispanic newborns in the state is 20 percent higher (71 versus 51 percent) than noted nationally. Further, Hispanics comprise 24 percent of all newborns nationally while this is true of only 6 percent of those in South Dakota. Alternately, 14 percent of all births in the state are American Indian and this is true of only 1 percent nationally. Black newborns in South Dakota are a fifth percent (3 percent versus 15 percent) noted nationally.

Figure 5. Newborns, South Dakota and United States.



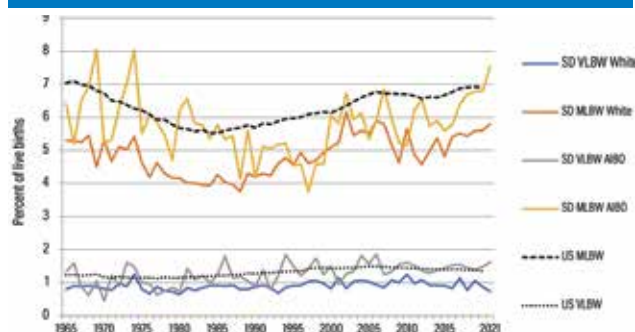
Birthweight is an important measure of perinatal outcome. Figure 6 illustrates South Dakota's persistent trend of having a lower percent of low birth weight (LBW) than observed nationally. In 2021, 7.1 percent of its newborns were LBW compared to 8.2 percent noted country-wide in 2020.^{2,5} The state's percent of LBW newborns, however, showed a slight increase in 2021 from the 6.9 percent noted in 2020.^{1,2}

Figure 6. Low birth weight, United States and South Dakota, 1965-2021.



Breaking the data on LBW into sub categories of mid low birth weight (MLBW = 1,500-2,499 g) and very low birth weight (VLBW = <1,500 g) provides greater clarity about the outcome of pregnancy and likely survival during the first year of life. Figure 7 presents these South Dakota data that are also broken down by sub-groups and compared to data for all populations country-wide. Consistently, the percentages of AIBO newborns in both the VLBW and MLBW groups, in South Dakota, have been higher than noted among whites. In 2021, there was an increase in South Dakota MLBW newborns for both white and AIBO newborns.² This increase (6.9 to 7.5 percent) for the AIBO population was most notable and surpassed what was noted for all populations in the country. The percentage of white VLBW newborns (0.73 percent) dropped to its lowest ever recorded in 2021 while the percent of AIBO VLBW newborns (1.6 percent) increased to its highest point since 2006 and surpassed the

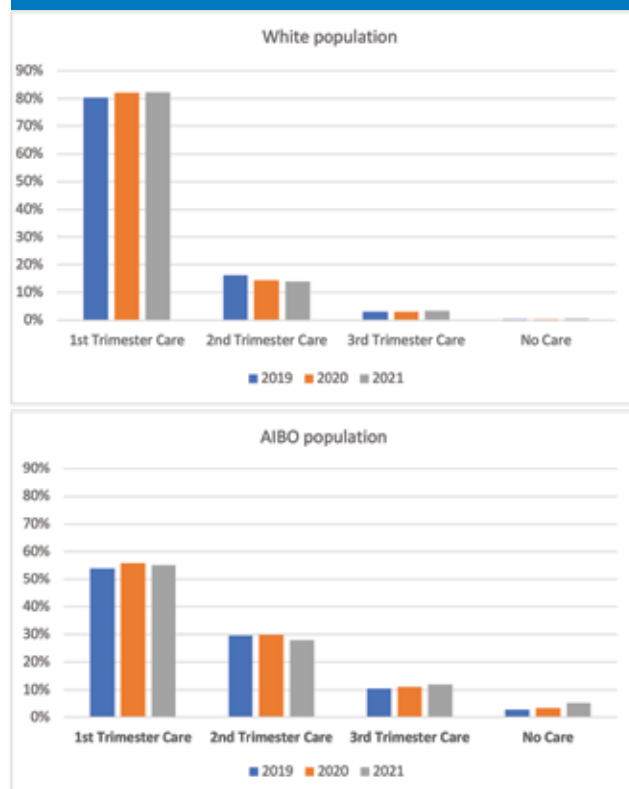
Figure 7. South Dakota very low birth weight (VLBW <1500 g) and mid low birth weight (MLBW - 1,500-2,499g): white and minority populations, 1965-2021. United States very low birth weight and mid low birth weight: total population, 1965-2021.



percent (1.3 percent) noted for all populations nation-wide in 2020.⁵

Concern has been expressed during the pandemic regarding how routine medical and preventive care was not being accessed by the general population. Prenatal care was of special concern as it impacts not only a pregnant woman's health but also that of her yet to-be-born infant. Data presented in Figure 8 show that in South Dakota there was little variation between 2019 and 2020-2021 in the onset of prenatal care.^{1,2} Disparity does, however, exist between the white and AIBO populations in the onset of prenatal care with 80 percent versus 55 percent of white and AIBO pregnant women receiving this care during their first trimester of their pregnancies. Data show very slight improvement in first trimester prenatal care during the pandemic. This observation reveals the probable effectiveness of support provided for accessing this important care during a time when challenges existed for those who needed prenatal care.

Figure 8. Onset of Prenatal Care, White and AIBO, South Dakota, 2019-2021.



Infant Mortality

In 2021 there were 10 fewer infant deaths (n=71) in South Dakota than observed in 2020.^{1,2} This finding, combined with the increase of 353 more births, led to the decrease in

the infant mortality rate (IMR) from 7.4 to 6.3, as seen in Figure 9. This 2021 rate is not statistically significantly lower than its previous five year mean (2016-2020) of 6.5. Figure 9 also shows that the state's 2021 IMR remains higher than that of the U.S., which was 5.4 in 2020.⁶

Figure 9. Infant mortality, South Dakota and United States, 1964-2021.

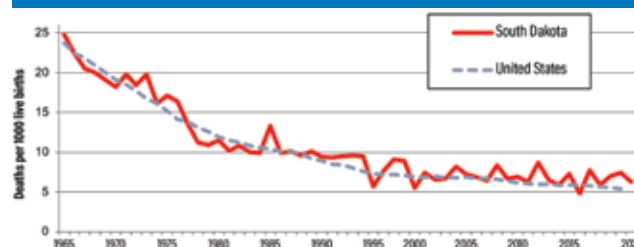
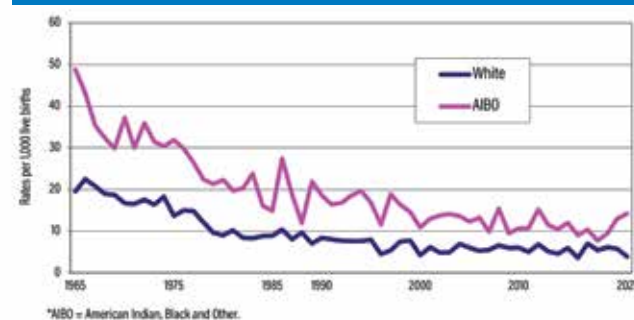


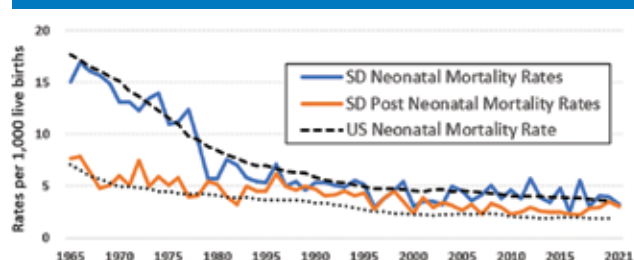
Figure 10 breaks down the state's IMR by race and shows that it decreased for white but increased for AIBO infants. This increase in the AIBO rate of infant death to 14.2 is notable in Figure 10 but reflects only three more deaths that sway its rate based on a relatively small base of births. The 2021 IMR for whites (3.9) was a third the rate for the AIBO population.

Figure 10. Infant mortality, white and AIBO*, South Dakota, 1965-2021.



To further examine the dynamics affecting infant mortality rates, it is helpful to examine them by when during the first year of life they occurred. Figure 11 provides these data for South Dakota showing that in 2021 the decrease in its IMR occurred in both the neonatal mortality rate (NMR = deaths in first 27 days of life per 1,000 live births) and in the post

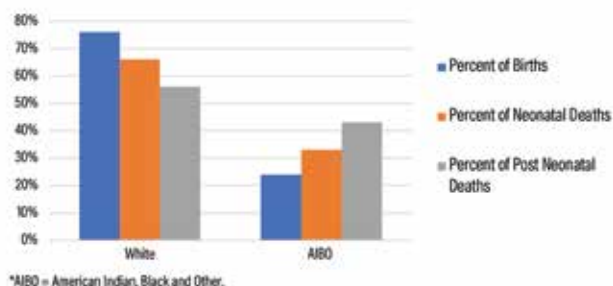
Figure 11. Neonatal and post neonatal mortality rates, total population, South Dakota and United States, 1965-2021.



neonatal mortality rate (PNMR = deaths between the 28 to 364 days of life per 1,000 live births). These declines, however, were driven by a decrease in the rate of death for only white infants. Both the NMR and PNMR rates for AIBO increased between 2020 and 2021 yielding the spike in the total IMR noted in Figure 10. Between 2020 and 2021, the AIBO NMR increased from 6.7 to 7.1 and the PNMR increased from 6.3 to 7.1 for this population.

Figure 12 demonstrates the disparity noted in the distribution of white and AIBO births and infant deaths in South Dakota. As noted above, between 2017-2022 approximately 74 percent of South Dakota's newborns were white, yet, they comprised a smaller proportion of infant deaths with only two-thirds of all neonatal and 56 percent of postneonatal deaths identified as white. Alternately, almost a quarter of all newborns are AIBO yet they comprise a greater share of infant deaths with one third of all neonatal and 43 percent of postneonatal deaths represented by them.

Figure 12. Distribution of births and neonatal and postneonatal deaths, South Dakota, 2017-2021.



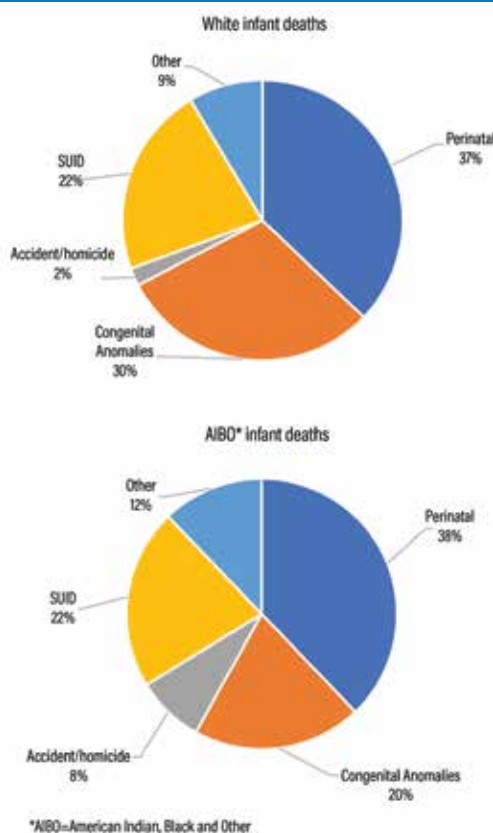
Infant mortality by birth weight is explored in Figure 13 that compares South Dakota's most current 2021 data with its previous five year mean (2016-2020)² and with the U.S. mean for 2017-2019.⁷ While typically nearly all newborns weighing less than 500 grams do not survive, in 2021 mortality was 70 percent for this group in South Dakota that also included fewer of them (n=10) than the mean for the previous five years (n=15). Among other South Dakota LBW cohorts, only those with weights between 500 to 999 grams showed an increase (26.9 percent to 31.8 percent) in infant mortality between 2021 and its mean for 2016-2020 but it is higher than that noted nationally. There was also a South Dakota increase (0.65 percent to 1.6 percent) in 2021, compared to the previous five year mean in mortality during infancy among those who were not LBW and this percent mortality is higher than that of the U.S. These data should be interpreted with great caution given the small number of deaths in each cohort.

Figure 13. Infant mortality by birth weight, total population, South Dakota and United States.



Figure 14 begins to address the causes of infant deaths among South Dakota's AIBO and white populations and the reasons for the disparity in their mortality rates.^{1,2} Noted in these pie charts, however, are distinctly similar distributions of several of these causes of death for white and AIBO infants. Perinatal causes and sudden unexpected infant death (SUID) comprise nearly identical percents of all deaths (37-38 percent and 22 percent) for the white and AIBO population of infants. Differences exist for congenital anomalies that are the cause of 30 percent of white and 20 percent of AIBO infant deaths. The Other category of death caused 9 percent of deaths for whites and 12 percent for the AIBO infants. This category

Figure 14. Cause of infant death, South Dakota, 2017-2021.





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primarily includes infections. Nearly all deaths (96 percent) due to perinatal causes occur in the neonatal period while nearly all deaths SUID deaths (92 percent) occur in the post neonatal period.

The distribution of causes of infant deaths noted in the pie charts (Figure 14) show similar patterns for white and AIBO infants for SUIDs and perinatal causes of death, however, to be seen in Figure 15 and Table 1 the rates of these causes of death, expressed per 1,000 live births, demonstrate their considerable disparity. Figure 15 illustrates this disparity also noted in the the total mortality rates by race presented in Figure 10. These longitudinal data also enable observation of shifting year to year patterns in the causes of death. For both the white and AIBO newborns, there was noted an increase between 2020 and 2021 in the rate of infant death due to “Other” causes that are primarily infections. Among these deaths were a very few with ICD codes for COVID-19 or coronavirus. The authors, however, acknowledge there may be lack of consistency in how these deaths may be certified. For the AIBO, between 2020 and 2021, there was also an increase (2.0 to 4.3) in the rate of death due to congenital anomalies. Though there was an increase in LBW newborns in 2021, there was a decrease among both populations in rates of death due to perinatal causes.

Table 1 provides data that compare five year means of causes

Table 1. Causes of infant death, South Dakota and United States.

Causes of death	Rates per 1,000 live births*						
	South Dakota infant mortality rate				Total population		
	2021	2017-2021					
	Total population	White	AIBO	P White vs. AIBO	SD 2017-2021	US 2020	P SD vs. US
Perinatal causes	2.1	2.1	4.1	<.01	2.6	2.6	NS
Congenital anomalies	1.8	1.7	2.2	NS	1.8	1.1	<.01
Sudden unexpected infant death (SUID)	1.3	1.2	2.3	<.01	1.5	0.9	<.05
Accidents and homicides	0.1	0.1	.9	NA	0.3	0.2	NS
Other*	1.0	0.5	1.3	<.01	0.7	0.6	NS
Infant mortality rate	6.3	5.6	10.9	<.01	6.9	5.4	<.01
Neonatal mortality rate	3.3	3.5	5.6	<.01	4.0	3.6	NS
Post neonatal mortality rate	3.0	2.1	5.3	<.01	2.9	1.9	<.01

All South Dakota data are from South Dakota Department of Health; US data from CDC

NA = Cell sizes too small to calculate p value, NS=Not significant

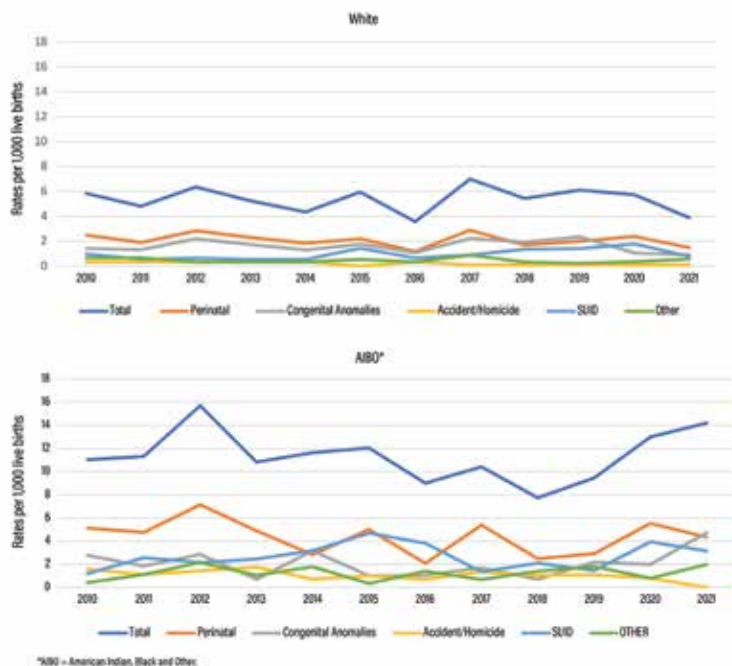
Other = Medical conditions such as infections, malignancies, etc.

p values < 0.05 are considered significant

of infant mortality for South Dakota’s white and AIBO infants.¹ With the exception of congenital anomalies and accidents/homicides, the state’s AIBO infant rate of death for other causes (perinatal, SUID and other causes) is higher ($p<.01$) than for white infants. This is also true of its total IMR, NMR and PNMR. Comparisons of the state’s mean 2017-2021 causes of infant death with those for the U.S. in 2020 show that its rates for congenital anomalies and SUID causes are significantly ($p<.05$) higher than those noted nationwide.⁶ While the state’s mean 2017-2021 NMR is not significantly different than that of the nation, its IMR and PNMR are higher ($p<.01$) than that of the country.

A specific look at SUID deaths is of special interest as there is a current understanding that many of these deaths may be preventable. Figure 14, shows that 22 percent of all infant deaths for both whites and AIBO infants are caused by SUID yet, noted in Table 1 is the state’s rate of death due to this cause is almost twice as high for AIBO than white infants. Further, the state’s current rate of SUID is higher than that noted nationally. SUID is a term used for three certifications of unexpected infant death. They

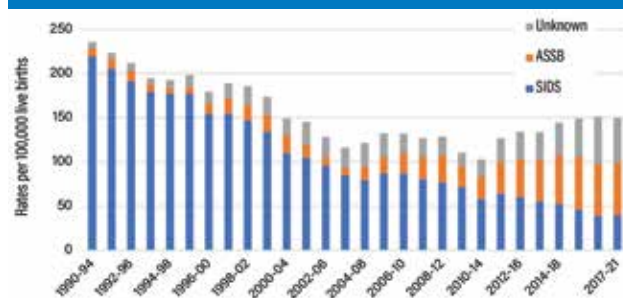
Figure 15. Infant mortality rates by cause: white and AIBO, South Dakota, 2010-2021.



*AIBO = American Indian, Black and Other

include: sudden infant death (SIDS – used when all possible causes are ruled out), accidental suffocation or strangulation in bed (ASSB – used when death scene investigations reveal hazards in sleep environment associated with death) and unknown (used when cause cannot be determined). Figure 16 shows how the rate of all of these deaths has been decreasing over time and how there has been a shift in how they are certified. Figure 16 also shows that in the early 1990s, nearly all SUIDs were attributed to SIDS. Over time, death scene investigations became more common and began to use doll reenactments leading to greater understanding of how environmental risk factors were associated with these deaths. This has been associated with an increase in the certification of SUIDs as caused by ASSB and unknown. In addition, Figure 16 demonstrates with five year moving averages that decrease in SUIDs that occurred with the onset of the “back to sleep campaign” that began in the early 1990s has slowed and regrettably has even begun to reverse. In 2021, the state had 15 SUID deaths compared to 25 in 2020.¹ This yielded a rate of this cause of infant death similar to that observed between 2016 and 2019. While this decrease from the previous year is a positive occurrence, the lack of consistent state progress in decreasing these tragic deaths highlights ongoing needed efforts to provide effective public education.

Figure 16. Five year moving averages of SUID infant deaths, total population, South Dakota, 1990-2021.



Discussion

Each year, as perinatal outcome data for the first year of life in South Dakota are explored, a story emerges. Annual data may provide additional evidence of continuing trends while other data suggest shifting patterns in how this story may be evolving. Of special interest is how the recent data in this report are from the pandemic year of 2021.

The take-away message from 2020 was the lowest rate of birth this year ever recorded in the state. This low point was not sustained in 2021 that saw an increase in births. The distribution of births shows that there is a slight downward

slope in the percent of AIBO newborns in the state and that the respective contribution of these births that are American Indian is declining. Nonetheless, the diversity of new babies arriving in the state has increased with Black and other groups increasingly adding to the state's population. This change in the composition of the backgrounds of South Dakota residents calls for increased sensitivity to cultural issues that impact learning, care practices, and access to health care.

Utilization of routine health care was of concern during the pandemic, yet data from 2020 and 2021 describing the onset of prenatal care provide evidence suggesting that this important care did not appear to be adversely affected by our response to the virus. Though ongoing disparities in first trimester care have persisted between the state's white and AIBO populations, they did not widen during 2021.

Interpretations of perinatal outcome data for any one year in South Dakota always poses challenges related to the state's small and recently diminishing number of births. Mortality rates that are expressed per 1,000 live births swing in notable ways, yet may reflect only slight changes in absolute numbers of deaths. This is very apparent in the 2021 AIBO IMR that had an apparent upward spike that included three more deaths than observed in the previous year when there also was only one additional live birth in this year. Unique to 2021, however, was the doubling from 2020 in the number of infant deaths attributed to “other” causes that are primarily infections. Among these 2021 infant deaths were a very few certified as COVID-19 or coronavirus. Caution must be exercised in interpreting data from death certificates. The pandemic created novel challenges for epidemiological data. Excess mortality remains the best way to measure COVID-19's impact on infant mortality. A significant excess in infant mortality was not seen in 2021 (although given the small number of infant deaths in South Dakota an excess of deaths may become apparent in subsequent years). Nonetheless, death certificate data from the state suggest that COVID-19 or coronavirus may have taken lives among the very youngest of those in South Dakota.

The state has consistently shown a significantly higher rate of infant death due to congenital anomalies than noted nationally and is the cause of nearly a quarter of all its infant deaths. This finding could be related to decisions made by prospective parents regarding the continuation of a pregnancy if lethal malformations are prenatally diagnosed. Ongoing observations of this trend will be instructive as the impact of the *Dobbs vs. Jackson* Supreme Court decision may

become reflected in infant mortality.

A persistent trend noted in the state's perinatal outcome data is its lower than national percent of LBW newborns, yet its higher than national IMR. This occurs regardless of the state's rate of death due to perinatal causes that is not significantly different from that observed nationally. Data on birth weight specific mortality rates for the state, however, show that they are slightly higher than noted nationally. Further, the state's PNMR rate remains consistently higher than noted nationally though most all of these deaths are not LBW and are disproportionate among births in the AIBO population.

Tracking deaths due to SUID enables observations of a cause of infant death that is increasingly known to have preventable risk factors and comprising 22 percent of infant death in South Dakota. There was a decrease in these deaths in 2021 from the previous year, yet moving five year means show little change in recent years. In 2022, the American Academy of Pediatrics updated its previous recommendations for reducing infant deaths in the sleep environment.⁸ Among this newest guidance is the recommendation that infants sleep on their backs on a firm, flat and non-inclined surface. In emergency situations, it is recommended that a box, basket or dresser drawer be temporarily used. Breastfeeding for the first six months is recommended. Infants should sleep in the parents' room close to the parents' bed but on a surface designed for safe infant sleep for ideally the first six months following birth. Bed sharing is not recommended under any circumstance. Avoidance of infants' pre and post natal exposure to nicotine, alcohol, marijuana, opioids and illicit drugs is also recommended. Routine immunizations and use of a pacifier are also recommended to reduce the risk of sudden unexpected death in infancy.

These updated recommendations are supported with data and the challenge becomes finding ways for them to be shared and embraced by not only new parents but entire communities that create norms for infant care. Cultural practices, family preferences, awareness of risks, and investments of energy and resources to change habits of infant care all impact how care is provided for an infant. Saving the lives of infants is not alone in the hands of those who provide health care. Communities create expectations and provide resources that enable the safety of its youngest citizens. Currently seeing how a large corporation that sells mattresses is using an image of a baby alone on their back in a crib having a firm mattress and devoid of soft objects is certainly a reassuring sign of how a step can be taken in the right direction that illustrates how

safe sleep can be promoted – while also marketing a product.

An examination of infant deaths in South Dakota shows that if its rate of SUID was comparable to the national rate, South Dakota would have had an IMR of 5.8 and not 6.3. This cause of death, along with our higher than national rate of congenital anomalies, contribute to our total rate that exceeds what is noted nationally.

Summary of Conclusions

1. The five year (2016-2020) decline in South Dakota live births reversed with an increase between 2020 and 2021.
2. The South Dakota birth rate remains slightly higher than the U.S. rate.
3. The state's percent of AIBO (American Indian, Black and Other) births has declined to 22 percent with 60 percent of them American Indian.
4. The diversity of AIBO births is increasing.
5. South Dakota has consistently had a lower percent of low birth weight infants than noted country-wide and its rate of infant death to perinatal causes is similar to national rates.
6. There was not a decrease in utilization of first trimester prenatal care during 2020 and 2021 compared to the pre-pandemic year of 2019.
7. Between 2020 and 2021, South Dakota's infant mortality rate decreased for its white but not its AIBO population and its total rate remained significantly higher ($p < .01$) than that of the U.S.
8. Post neonatal mortality in South Dakota has consistently been higher than national rates with a disproportionate percent of these deaths occurring among the AIBO infants.
9. Sudden unexpected infant death decreased in 2021 from 2020 but five year means for its rate have shown little recent improvement.
10. There was an increase in the South Dakota rate of infant death between 2020 and 2021 due to "other" causes that may include deaths attributed to COVID-19 or coronavirus.

Concluding Comment

The pandemic has taught all the world's people that we are intricately inter-connected. The virus does not heed boundaries and all share responsibility for mitigating

its spread. The effect of the pandemic on South Dakota infant mortality is unclear, but babies may not have been immune to its potentially fatal consequences. Further, the impact of COVID-19 on the health and survival of women during pregnancy is currently being explored nationally and outcomes of this research could impact an understanding of perinatal outcomes.

This annual report often concludes with the message that infancy is a time of vulnerability for all babies and problematic early birth, genetic defects, infections, and care practices may threaten survival. While recognizing this vulnerability, those who provide health care for infants cannot prevent all that may impede survival in the first year. Many risks, however, can be prevented and this is a task for everyone who forms the social network that surrounds babies who hopefully may thrive during their first year and future life.

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Evidence Based Strategies in the Management of Localized Prostate Cancer and the Role of Brachytherapy

Daniel G. Petereit, MD; Colton Powers, MD; Steven J. Frank, MD; Peter Rossi, MD; and Mira Keyes, MD

Dr. Petereit and colleagues have coalesced an enormous amount of data and opinions regarding the controversies surrounding early detection and treatment of prostate cancer into a concise reference piece that rivals anything I have read in my career. They tackle the challenges of early detection including over diagnosis and treatment. It is difficult to summarize all the different cohorts and therapies of local prostate cancer, yet they succeed in providing a reasonable assessment of all the various therapeutic modalities. I am surprised that they requested a surgeon(me) who has performed over 5000 radical prostatectomies to comment on a manuscript written by radiation oncologists who focus on brachytherapy. Nevertheless, I agree with most of their opinions regarding the place of this modality in our local treatment armamentarium. Brachytherapy has proven benefits which have evolved over time. My criticisms of the paper focus on their lack of incorporating molecular markers in early detection to find cancers that need to be found and treated. Regarding, active surveillance, we don't want to find patients who need this; we want to find patients who need to be treated! They fail to delve into the targeted focal therapy (male lumpectomy) and the role of brachytherapy and other targeted modalities.

There is a strong role for surgery done by an experienced urologist in many cases of prostate cancer. Brachytherapy has supplanted the need for external forms radiation in many men and Dr. Petereit and his co-authors clearly identified the benefit. This is a great review and as soon as published will be one that will be an expected review by residents and staff.

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Abstract

Prostate cancer management is a critical component of men's health with ongoing controversies in screening and treatment. The purpose of this manuscript is to review contemporary evidence-based strategies in the management of localized prostate cancer to optimize patient outcomes, satisfaction, and shared decision making, to improve physician education and awareness, and to emphasize the importance of brachytherapy in the curative management of prostate cancer.

The Bottom Line

1. Selective screening and selective treatment reduces prostate cancer mortality rates.
2. Active surveillance is recommended for low risk prostate cancer.
3. Both radiation and surgery are appropriate options for patients with intermediate-risk and high-risk prostate cancer.
4. Quality of life and patient satisfaction favors brachytherapy for sexual function and urinary incontinence and surgery for urinary bother.
5. For patients with intermediate risk prostate cancer, brachytherapy achieves very high cure rates, acceptable sided effects, high patient satisfaction and is the most cost-effective treatment.
6. For patients with unfavorable intermediate-risk and high-risk prostate cancer, the combination of external

beam radiation, brachytherapy, and ADT (Androgen Deprivation Therapy) achieves the highest rates of biochemical control and the lowest need for salvage therapies.

7. A collaborative shared decision making (SDM) process yields a well-informed, high-quality decision that is consistent with patients' preferences and value.

Screening

Traditionally, prostate cancer screening has consisted of obtaining a PSA (serum prostate specific antigen) and a DRE (digital rectal exam), followed by a transrectal ultrasound guided biopsy (TRUS-biopsy) – if indicated. However, these recommendations have been controversial, leading to confusion among physicians and their patients about whether prostate cancer screening has any role at all. For example, citing the lack of benefits outweighing the harms, the U.S. Preventive Task Force (USPSTF) first recommended against (grade D) PSA screening in men over 75 in 2008, and later discouraged screening in this age group altogether in 2012.¹⁻

Studies following the 2012 recommendation have demonstrated a substantial decline in both prostate cancer screening and diagnosis of early stage prostate cancer, and a subsequent increase in the rates of more advanced stage disease with higher Gleason Scores and patients with metastatic disease at presentation.² More concerning, however, the age-adjusted prostate cancer specific mortality (PCSM) decreased linearly between 1999 and 2012, but either leveled off or began to increase, depending on the specific age group, beginning in 2013 through 2019.³

In 2017, the USPSTF reversed their prior recommendation, listing serum PSA-based prostate cancer screening in men ages 55 to 69 years as a grade C recommendation. They also advised that the decision to undergo prostate cancer screening should be individualized to weigh the risks and benefits.¹ Since the change in recommendation, there has been a significant increase in PSA screenings.⁴

The European Randomized Study of Screening for Prostate Cancer (ERSPC), one of the largest randomized control trials (RCT), demonstrated a significant prostate cancer mortality reduction of 25 percent at 16 years.⁵ Analysis revealed that 18 patients needed to be screened to diagnose one prostate cancer, and 570 to prevent one death. The most mature treatment effectiveness randomized clinical trial is the Scandinavian Prostate Cancer Group-4 (SPCG-4) trial that demonstrated the benefits for definitive treatment

compared to watchful waiting in terms of disease specific, overall survival, and progression.⁶

The recent integration of multi-parametric MRI (mp-MRI) based prostate evaluation significantly improved selective compared to PSA-based screening and DREs. Mp-MRIs have a greater sensitivity for detecting clinically significant cancer as up to 25 percent of men may safely avoid a prostate biopsy based upon MRI criteria.⁷

The Melbourne Expert Panel Consensus on PSA testing emphasized reduced incidence of metastatic prostate cancer with an increase in cause specific survival in men age 50-69 who underwent screening, as well as the importance of uncoupling the diagnosis of prostate cancer from the decision to treat. PSA testing was recommended only for men with > 10 year life expectancy regardless of age, and included a baseline PSA at age 40-50. This is based on the “Malmö study” which demonstrated a single PSA test at the age of 44-50 years predicts subsequent clinically diagnosed prostate cancer. This introduces the concept of “smart screening”.^{8,9}

Management

Prostate cancer treatment options are based upon a risk stratification scheme which includes clinical staging with a DRE, pre-treatment PSA, and Gleason scores. MRIs are now routinely used to evaluate for potential local disease extension. The National Comprehensive Cancer Network (NCCN) employs a 6-tier stratification ranging from very low to very high risk (Table 1)

The options for each disease risk category are multiple, inherently leading to a debate amongst urologists and radiation oncologists over the optimal approach. Several factors are considered for each patient when choosing treatment, including but not limited to, life expectancy, disease risk category, expected outcome of each treatment option, potential complications of each treatment option, the patient's medical ability to undergo an invasive procedure and receive general anesthesia, and patient preference.

Active surveillance (AS)

AS is the standard initial management care for men with

Table 1. Table of NCCN prostate cancer risk stratification criteria.

Risk Group	Clinical/Pathologic Features		
Very low ^d	Has all of the following: • T1c • Grade Group 1 • PSA <10 ng/mL • Fewer than 3 prostate biopsy fragments/cores positive, ≤50% cancer in each fragment/core ^e • PSA density <0.15 ng/mL/g		
Low ^d	Has all of the following but does not qualify for very low risk: • T1–T2a • Grade Group 1 • PSA <10 ng/mL		
Intermediate ^d	Has all of the following: • No high-risk group features • No very-high-risk group features • Has one or more intermediate risk factors (IRF): ▶ T2b–T2c ▶ Grade Group 2 or 3 ▶ PSA 10–20 ng/mL	Favorable intermediate	Has all of the following: • 1 IRF • Grade Group 1 or 2 • <50% biopsy cores positive ^e
		Unfavorable intermediate	Has one or more of the following: • 2 or 3 IRFs • Grade Group 3 • ≥ 50% biopsy cores positive ^e
High	Has no very-high-risk features and has exactly one high-risk feature: • T3a OR • Grade Group 4 or Grade Group 5 OR • PSA >20 ng/mL		
Very high	Has at least one of the following: • T3b–T4 • Primary Gleason pattern 5 • 2 or 3 high-risk features • >4 cores with Grade Group 4 or 5		

very low or low risk prostate cancer and may be considered in patients with favorable intermediate disease. The AS protocol includes regular physical examinations, PSA measurement, repeat surveillance prostate biopsies, and mpMRIs with a frequency of no more than once every 12 months. (NCCN Guidelines) Conversion to treatment with curative intent is “triggered” by signs of disease progression or patient preference.^{10,11}

One of the largest randomized trials comparing AS to treatment was the ProtecT trial (Prostate Testing for Cancer and Treatment).¹² The majority of patients who participated had low risk to intermediate risk prostate cancer (77 percent). Nearly 55 percent of men assigned to active monitoring received “radical” treatment. While prostate cancer specific survival was high for all participants, there were definite differences in the rates of disease progression and metastasis. However, because of the relatively slow progression of prostate cancer and the effectiveness of subsequent treatment options, potential delays in definitive treatment after initial AS were not associated with significantly increased prostate cancer specific mortality. Treatment following initial AS remains

effective, and studies document that up to 51 percent of patients initially managed with AS discontinue the regimen and choose definitive treatment. With the increasing utilization of AS, nearly 50 percent of low-risk prostate cancer patients avoid treatment altogether. However, there is a potential lost opportunity for cure, and in the long term AS can be more expensive than treatment with multiple biopsies and multiple MRIs.

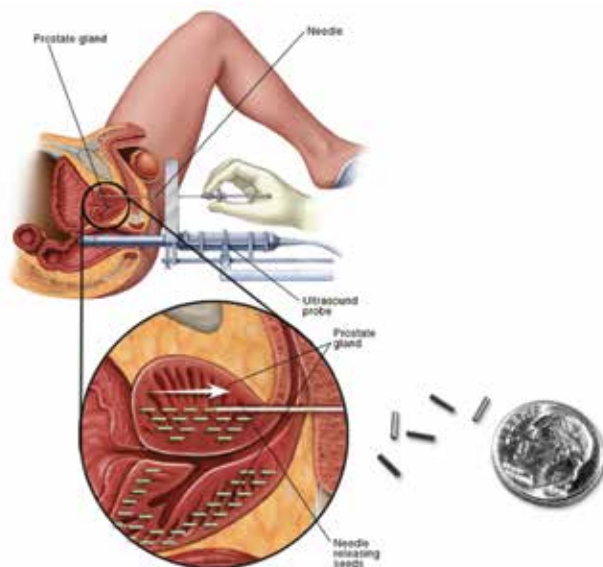
Definitive Treatment

A radical prostatectomy (RP) has been a standard treatment approach, and is performed using a minimally invasive, nerve sparing technique — either with a traditional laparoscopic or a robotically assisted laparoscopic approach, which is now most commonly used. RP is indicated for patients with clinically localized prostate cancer who are likely to achieve negative margins, are medically fit with no significant medical comorbidities, and a life expectancy greater than 10 years. In general, patients who choose surgery tend to be younger, have lower medical co-morbidities, and have better bladder and sexual function at baseline compared to those who undergo radiation.

Definitive radiation therapy (RT) is the delivery of high dose, targeted radiation with curative intent. External beam radiation (EBRT) is the most common form of radiation using Intensity Modulated Radiation Therapy (IMRT) and requires 6 to 8 weeks of daily radiation. IMRT is an advanced radiation technology delivering a highly conformal radiation dose while sparing the adjacent normal tissues. Studies have demonstrated an approximate 10 percent improvement in biochemical control rates (PSA control) with IMRT compared to conventional external beam radiation as the dose can be safely escalated without an increase in late toxicities.^{13,14}

Brachytherapy (BT), or internal radiation, is a technique in which a small radioactive source or sources are inserted into the prostate gland using a transperineal approach under trans-ultrasound guidance, and is the most extreme form of dose escalation. The procedure takes about 45 minutes and is performed under general anesthesia, or an epidural. This is accomplished by either low-dose-rate (LDR) BT in which radioactive isotopes (iodine, palladium or cesium) are permanently placed in the prostate (Figure 1) and decay over several months, or high-dose-rate (HDR) in which catheters are temporarily placed in the prostate while an Iridium isotope travels down each of the catheters delivering a highly conformal dose over 15-20 minutes — often in one fraction (Figure 2). The advantage of brachytherapy is the delivery of high doses of radiation (much higher than IMRT) while

Figure 1. Low dose rate (LDR) prostate brachytherapy.



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sparing the adjacent normal tissues (much greater than IMRT) due to the rapid dose fall off. BT can be utilized either as definitive monotherapy, or in combination with IMRT as a “treatment boost” to achieve significantly higher doses of radiation for up to 17-52 percent and 13-57 percent greater biochemical control, when compared to IMRT alone, in patients with unfavorable intermediate and high risk disease, respectively. (Table 2)

TREATMENT OPTIONS: Surgery, Radiation, Which Form of Radiation, or Surgery Followed by Radiation

Men with favorable-risk prostate cancer (clinical stage T1C or T21bN0M0), PSA < 20 and Grade Group 1-2 can be offered AS, or definitive treatment with IMRT, BT or surgery. Men with unfavorable-risk and high risk prostate cancer (stage T2c/T3N0M0, PSA of 20-50 or Grade Groups 3-5) require more intensive treatment such as more extensive surgical resection or radiation: IMRT to the prostate and pelvic lymph nodes and dose escalation with either an IMRT or a BT boost to the prostate – most often delivered with 6-18 months of ADT (see NCCN guidelines).

PSA control or biochemical control rates are used as a surrogate for treatment efficacy as survival differences can take more than 10 years due to the natural history of treated prostate cancer, effectiveness of salvage therapies and patient death from other medical co-morbidities. A more recent surrogate to determine efficacy of interventions is the distant metastatic free survival (DMFS). In addition, there

Figure 2. High dose rate (HDR) prostate brachytherapy.



is evidence that in young and healthy men who undergo potentially curative therapy, the lack of PSA control increases all-cause mortality rates at 10 years.¹⁶ To state the obvious, the primary goal of local treatment is the prevention of metastatic disease that will shorten a patient’s life span. The goal of upfront treatment is cure in order to avoid the toxicities and expense of salvage therapies. In addition, PSA failure is clinically relevant and will lead to further investigations, early local/regional and systemic salvage, lifelong systemic treatment, financial toxicity, and patient dissatisfaction.

Favorable Intermediate Risk Prostate Cancer

These patients can be effectively managed with a high likelihood of cure with external beam radiation, brachytherapy, or surgery.

As indicated above, there is no significant difference in prostate cancer specific or all-cause mortality between surgery and radiation from the Protect Trial, most who had low and favorable risk prostate cancer. A recent single institutional study compared the effectiveness of BT, EBRT, and RP in the treatment of intermediate risk prostate cancer (42 percent unfavorable). From this analysis, the 10-year biochemical control rates were 80 percent, 57 percent, and 57 percent for patients treated with brachytherapy, RP, and EBRT, respectively (Table 2).¹⁷

Unfavorable Intermediate Risk and High Risk Prostate Cancer

Since more patients are now being diagnosed with high risk disease with Gleason scores of 8 and above due to the USPTF recommendations years ago, there is increased

utilization of surgery nationally.¹⁹ From the largest surgical series, the 5-year biochemical control rates for surgery alone are in the range of 30-40 percent.²⁰ The majority of these patients develop a biochemical failure and require 6 weeks of salvage EBRT, often with ADT for 6 months. With tri-modality therapy (EBRT, BT and ADT), biochemical control rates are 70-90 percent at 10 years (Table 2).²¹ There is no evidence that surgery followed by radiation provides a clinical benefit compared to definitive radiation alone consisting of tri-modality therapy. However, for patients with significant urinary obstructive symptoms, there is a benefit from surgery followed by postoperative radiation if indicated. Patients who are advised to undergo surgery should be aware that postoperative radiation and ADT is associated with higher rates of incontinence and erectile dysfunction (Table 3). While surgery has not been compared to radiation in a randomized trial, Level I demonstrates the superiority of tri-modality therapy for men with high-risk prostate cancer compared to IMRT with ADT (Table 2).

The most compelling evidence demonstrating the efficacy of tri-modality therapy comes from the ASCENDE-RT trial,²¹ in which patients were randomized to either dose escalation using full dose EBRT to 78 Gy, or EBRT to a lower dose (46 Gy) followed by an LDR BT boost of 115 Gy; both cohorts received 12 months of ADT. At 9 years the biochemical control rates were nearly 21 percent higher at 83 percent in the tri-modality group versus 62 percent in the IMRT group.

A detailed retrospective cohort study from 12 tertiary cancer centers compared surgery, EBRT, and EBRT with a brachytherapy boost for patients with Gleason scores of 9 and 10.²⁵ The

Table 2. Treatment efficacy of surgery, EBRT, and brachytherapy.

	Low risk	Favorable intermediate risk	Unfavorable intermediate risk	High risk
Surgery	bNED: 66-90% (a)	bNED: 57- 64% (a)(c)		bNED 25-50% (a) (d) 30-40% PCSM 12% (f) MFS 76%
IMRT +/- ADT	bNED: 58-85% (a)	bNED: 42-77% (a) (e) 70%		bNED 35-65% (a) (e) 58% PCSM 13% (f) MFS 76% (f)
BT alone	bNED: 88-98% (a)	bNED: 61-98% (a) PCSM: 99.6% (b) MFS: 99.6% (b) OS: 94.9% (b)	Usually not indicated, but for select patients (b) (c)	Not indicated
IMRT + BT +/- ADT	Not indicated	Not indicated	bNED: 80-90% (a) e) 94% PCSM MFS OS	bNED 85-92% (a) (e) 78% PCSM 3% (f) MFS 92% (f) OS

bNED - Biochemical No Evidence of Disease (PSA Failure free survival)

PCSM - prostate cancer specific mortality

MFS - metastasis free survival

OS - Overall survival

(a) Grimm, et al.¹⁸

(b) Steven Frank Phase II trial MDAH²⁰

(c) Barry W Goy et al.¹⁷

(d) Stephenson et al.²⁰

(e) ASCENDE RT²¹

(f) Kishan JAMA 2018²⁵

Surgery: **Low risk:** 10 year biochemical control 66-90%. **Intermediate risk:** 10 year biochemical control 57-64%. **High Risk:** 25-50%

IMRT: **Low risk:** 8 Year biochemical control 58-85%. **Intermediate Risk:** 10 year biochemical control 42-77%. **High risk:** 10 Year biochemical control 35-65%.

BT: **Low risk:** 10 year biochemical control: 88-98%. **Intermediate risk:** 10 year biochemical control 61-98%.

IMRT + BT +/- ADT: **Intermediate risk** 10 year biochemical control. IMRT + BT alone 80-90%. **High risk:** 10 year biochemical control IMRT+ BT+ ADT 85-92%

Table 3. Treatment toxicities of surgery, EBRT, and brachytherapy

	Active surveillance	Surgery	IMRT	IMRT and LDR BT	IMRT and HDR BT	BT	RP followed by adjuvant RT
Urinary incontinence	4%, 8% (6 months, 6 years) (c)	46%, 17% (6 months, 6 years) (c) 18% (g) 2.8% (M)	5%, 4% (6 months, 6 years, respectively) (c)	7% (n)	1.8% (d)	3% (n)	6.5% (M)
GU G3/ urethral Stricture		6.5% (c) (g) G3: 17-60% (j) Strictures 10% (j) 11% (L) 9.5% (M)	1.5% (b) (c) (g) 1.5% (a) 5% (L)	19% (b) (c) (g) 4.9% (a) 8-13% (i) 16% (L)	5% @ 10 yrs (d) 4% (d) 1.5% (f) 3.5% (k)	2.5% (c) (a) 1.9% (a) 2% (g) 1.3% (h) 11% (L)	17.8% (M) 14% (L)
≥ Acute Grade 3 urinary toxicity				5%	1% (e)	2.7% (h)	
Proctitis/rectal bleeding		0%			4% @10 yrs (d) 1.5% (f)	0.7% (h)	3.3%
Erectile dysfunction	48%, 70% (6 months, 6 years) (c)	88%, 83% (6 months, 6 years) (c)	78%, 73% (6 months, 6 years) (c)				

Meta-analysis of urethral strictures (a)⁴⁰

ASCENDE RT (b)²¹

Protect (c)¹²

RTOG 0321 (d)⁴¹

Martell and Morton (HDR boost) (e)²⁵

Tharmalingham H, Hoskins (f)⁴²

Italian RCT (g)⁴³

MDAH Frank (h)³⁹

Summary from 5 RCTS (i)

Summary from 6 surgical RCTS (j): PIVOT⁴⁴, PROTECT⁴⁴, PCOS, SPCG, Italian RCT⁴⁵

Morton summary⁴⁶ (k):

Elliot, CAPSURE (L)⁴⁶

Thompson SWOG JAMA 2006 (M)⁴⁷

RTOG 0232 (N)

resulting robust association between a BT boost compared to surgery and EBRT is likely due to markedly improved local control rates that prevented a second wave of metastatic disease. Higher biochemical control rates with tri-modality therapy were also verified in three other RCTs as discussed, supporting the argument that this intervention upfront may be the optimal treatment.^{24,26}

So compelling is the evidence supporting BT as monotherapy for intermediate risk prostate cancer and as a method of dose escalation for high risk prostate cancer that in 2017 the following guideline was published from the American Society of Clinical Oncology (ASCO)/Cancer Care Ontario: “For patients with intermediate-risk prostate cancer choosing EBRT with or without ADT, BT boost (LDR or HDR) should be offered to eligible patients. For low-intermediate risk prostate cancer LDR BT alone may be offered as monotherapy. For patients with high-risk prostate cancer receiving EBRT and ADT, a BT boost (LDR or HDR) should be offered to eligible patients.”²⁷

Therefore, given the high recurrence rates after surgery or external beam radiation alone in patients with high risk prostate cancer, the addition of brachytherapy should be viewed as the gold standard treatment, and should be discussed with all newly diagnosed prostate cancer patients.

RADIATION TOXICITIES AND MITIGATION STRATEGIES

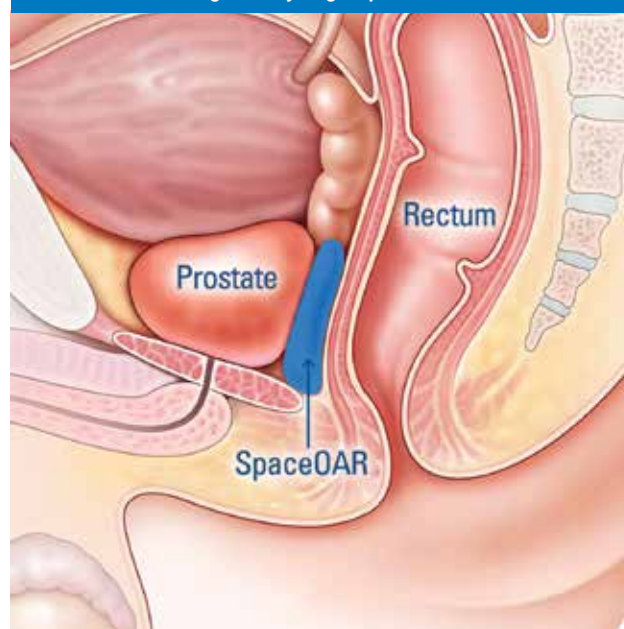
Urinary

For patients who undergo prostate LDR BT, the side effects include but are not limited to moderate irritative, obstructive urinary symptoms and dysuria (50 percent), which are usually worse 3-4 weeks after the implant and gradually subside in 6-12 months. 10 percent of the patients never fully regain their baseline status. The late urinary toxicities include a 5 percent risk of a urethral stricture requiring a dilatation, 1 percent risk of incontinence and < 1 percent risk of urethral necrosis (Table 3). In contemporary LDR BT series, the rates of urethral strictures are approximately 3.5 percent by limiting the dose to the external urethral sphincter and membranous urethra with MRI-assisted radiosurgery (MARS) with MRI-based planning, treatment, and assessment.²⁸

Rectal

To minimize rectal injury from radiation, either from BT or EBRT, the hydrogel SpaceOAR device is frequently inserted to create distance between the posterior prostate and the anterior rectal wall (Figure 3). The SpaceOAR device is a non-toxic, biocompatible gel comprised mainly of water and polyethylene glycol that absorbs in 6 months. Placement

Figure 3. Hydrogel SpaceOAR.



Used with permission from Boston Scientific.

of the device is a simple outpatient, transperineal procedure that is safely performed in 15-20 minutes.³⁰

Sexual

Loss of erectile function (EF) can be immediate after prostate BT, but frequently followed by a gradual recovery. Overall, sexual function declines at a rate that parallels the decline due to the aging process. Fifty percent of EF after BT is related to the procedure, and the other 50 percent is related to the aging process. On average, at 5 years sexual function is preserved in 50 percent of patients, but is strongly determined by pretreatment erectile function.³¹

PATIENT RELATED OUTCOMES (PRO)

While prostate cancer treatment options achieve similar overall survival rates at 5 years, there are differences in PSA control, prostate cancer specific mortality and metastatic rates. Each treatment modality has unique risks and toxicity profiles that impact patients' quality of life and ultimate treatment decision. Reported outcomes for 1,386 patients from the SEER database were recently published from Hoffman et al comparing AS, surgery, BT and EBRT with or without ADT using a validated 26-item Expanded Prostate Index Composite (EPIC) assessing the domains of sexual function, urinary incontinence, urinary irritative, bowel function and hormonal function. The analysis was performed for men with favorable- risk and unfavorable-risk disease as the latter group requires more intensive therapy.³²

For both risk groups at 5 years post treatment, clinically meaningful worse urinary incontinence was observed for those who underwent a radical prostatectomy (40 percent) compared to other treatment options. Significant declines in sexual function were observed in all treatment groups, including those who underwent AS due to age related functional changes. The effect on sexual changes, for both groups, was greatest in those who underwent surgery (75 percent), which is consistent with data from other studies including ProtecT.¹² BT was associated with more urinary irritative, sexual and bowel function at 1 year post treatment compared to AS. For men with favorable risk disease treated with EBRT, functional endpoints were not different at all time points compared to those who underwent AS. However, men with unfavorable risk disease treated with EBRT and ADT had lower bowel function at 1 year compared to AS, and better sexual function and lower rates of incontinence at 5 years compared to those who had surgery.

Toxicities of Salvage Treatment

Although rates of overall survival or prostate cancer specific survival may be equivalent, regardless of the initial treatment, the probability of achieving long term biochemical control and a reduction in metastatic failure is superior for higher-risk prostate patients who undergo tri-modality therapy. The toxicities of salvage treatment are often not adequately discussed when patients are deciding on their initial treatment. Not only does durable biochemical control decrease patient anxiety, it also decreases treatment related toxicity and lifetime costs associated with adjuvant and/or repeated salvage therapy that is toxic, more expensive, and at times, futile, treating disease that is incurable. The best therapeutic ratio is achieved when patients are cured with upfront treatment.

Discussion

Screening, Detection, and Active Surveillance

A major criticism of prostate cancer management is the non-selective screening, diagnosing, and over-treatment of patients of all ages and health. Current screening strategies are more selective with increasing utilization of AS to manage prostate cancer more appropriately. Younger, healthier patients should be selectively screened because they are most likely to benefit from screening and potentially definitive treatment, especially if they have a positive family history. Screening should begin with a PSA measurement and DRE. Younger, healthier patients found to have an elevated PSA, PSA delta > 2 ng/mL/yr, or a PSA doubling time < 9 months may benefit most from pursuing a prostate biopsy.

Other patients, or those who have a borderline PSA and/or equivocal DRE may benefit from an mpMRI to potentially avoid a biopsy altogether. Use of mpMRIs has increased the diagnostic accuracy of screening and may reduce unnecessary biopsies by up to 25 percent. The increased utilization of AS has become the standard of care for patients with very low to low-risk prostate cancer. Up to 50 percent of patients may forgo treatment altogether in this cohort, and the other 50 percent who receive definitive treatment will not experience significantly worse outcomes due to treatment delays. Appropriately selected screening and treatment will save lives without the burden of unnecessary morbidity.

Treatment

Surgery achieves the best clinical outcomes for patients who have a low probability of having high risk features requiring salvage treatment; however, at least 20-30 percent of these patients still require salvage EBRT. BT alone is a very effective option for low and intermediate risk patients, and it is also the cost effective definitive treatment modality with a favorable toxicity profile – more cost effective than active surveillance. Tri-modality therapy achieves superior biochemical control rates in patients with high risk features, compared to surgery followed by adjuvant radiotherapy, at a significantly reduced cost. With modern planning LDR techniques and HDR brachytherapy, the rates of grade 3 toxicities are less than 5 percent. For younger patients with a life expectancy more than 10 years, there is evidence that increased rates of PSA control will improve survival. The advantage of optimal treatment upfront is the avoidance of preventing the need for downstream anxiety, cost, and adverse effects of salvage therapy.

BT Utilization, ABS Strategies (300 in 10) and Shared Decision Making (SDM)

Nationally, there has been decrease in brachytherapy (BT) utilization.³⁴ BT is lifesaving for women with advanced cervical cancer who suffer dramatically lower cure rates if BT is omitted.³⁵ BT is also critical for the management of prostate cancer patients as it achieves the highest biochemical control rate as discussed above. Inadequate resident training and low procedural volumes are the greatest barriers for residents achieving independence in BT.³⁶ To address these issues, the American Brachytherapy Society (ABS), has implemented a 10-year strategy called 300 in 10. The goal is to train 30 competent brachytherapy teams per year over the next 10 years through a multi-faceted approach.³⁷

Unfortunately, many patients in the U.S. do not have access

to prostate brachytherapy, especially in rural America. The only radiation option for them is 6 to 8 weeks of IMRT which is a dilemma as distance to the cancer center is a treatment barrier. For example, prostate BT was previously performed at cancer centers in South Dakota, but is now only available to patients in Rapid City. Prostate BT is no longer offered to patients in Sioux Falls due to low procedural volumes, even though the majority of prostate cancer patients in South Dakota are evaluated and managed there. Reasons for this include physician preference/bias, patient education, and lack of service to this critical treatment modality.

Because of the complex treatment approaches for managing prostate cancer, each with unique toxicities profiles, clinical outcomes and cost, a multi-disciplinary approach should be the standard of care. Shared decision making (SDM) with consultations from both urology and radiation oncology prior to treatment results in physicians' improved patient selection, and in patients' improved choice and satisfaction. Equally important, clinical outcomes are improved at a lower cost. *Patients deserve a formal consultation discussing treatment options from both specialties.*

In June of 2022, American Urology Association and the American Society for Radiation Oncology published their guidelines on the management of clinically localized prostate cancer.³⁸ From their joint statement, "RCTs of SDM versus routine care have demonstrated that patients engaged in this process are for more knowledgeable, have more realistic expectations, participate more actively in the care process, and more frequently arrive at decisions aligned with their personal preferences."

Conclusion

The purpose of this manuscript is to communicate evidence-based approaches to prostate cancer management. Prostate cancer screening is appropriate when it is selective. Prospective randomized control trials have not proven any one treatment modality to be superior in terms of overall or prostate-specific survival. However, tri-modality therapy (EBRT, BT and ADT) achieves the highest rate of biochemical control and lowest need for subsequent salvage therapy for more aggressive prostate cancers. The ABS 300 in 10 program was created to address the decline in prostate BT to improve patient access to quality BT across the world.

Proper patient selection is critical when deciding on treatment. Each patient's unique disease and medical comorbidities must be taken into consideration in a multidisciplinary approach to ensure patients are treated

appropriately. Thoroughly informed patients who consent to treatment are less likely to regret their medical decisions.

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Analysis of Substance Use and Suicidal Ideation in Midwestern Frontier and Non-Frontier Locations

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Abstract

Background: Emergency departments represent a unique opportunity to intervene in mental health and substance use crises. For people residing in frontier and remote locations (> 60 min from cities of 50,000 people), emergency departments may be a critical source of mental healthcare, given limited local access to mental health professionals. The purpose of the current study was to investigate emergency department usage for substance use disorders and suicidal ideation in patients residing in frontier and non-frontier locations.

Methods: South Dakotan syndromic surveillance data from 2017-2018 were obtained for this cross-sectional study. ICD-10 codes were queried to identify substance use disorder and suicidal ideation during emergency department visits. Differences in substance use visits were investigated in frontier and non-frontier patients. Additionally, logistic regression was used to predict suicidal ideation in cases and age- and sex-matched controls.

Results: Frontier patients had a higher percentage of emergency department visits with a diagnosed nicotine use disorder. Conversely, non-frontier patients were more likely to use cocaine. Substance use for other categories of substances was similar between the frontier and non-frontier patients. Alcohol, cannabis, nicotine, opioid, stimulant, and psychoactive substance diagnoses all increased the patient's odds of receiving a suicidal ideation diagnosis. Further, residing in a frontier location also increased the odds of suicidal ideation.

Conclusions: Patients residing in frontier locations differed in some forms of substance use disorders and in suicidal ideation. Increasing access to mental health and substance use treatment may be critical for those residing in these remote locations.

Introduction

Substance use disorders and suicide are often co-occurring.¹ In the U.S., suicide and substance use deaths have increased dramatically over the past decade. Specifically, unintentional drug overdoses have increased approximately five-fold from 1999 to 2017.² Similarly, in 2018, suicide was the 10th leading cause of death in the U.S.^{3,4} Because these preventable deaths are increasing, understanding trends and the opportunities to intervene are critical. Rural health disparities exist in these measures of preventable deaths. Overall, suicide rates were 45 percent higher in rural than metro areas.³ Although suicide rates have increased in both rural and urban settings, the rate of increase was higher for males and females in rural settings compared to urban.³ Drug overdose deaths have increased in both urban and rural settings, but small metros and large fringe metros had slightly higher deaths per capita than rural and large central metros.²

For certain types of substances, overdose mortality differed across the rural/urban continuum.⁵ Methamphetamine

overdoses and alcohol-related deaths were significantly higher in rural settings, but heroin and cocaine-related deaths were higher in urban environments.^{6,7} Finally, emergency department visits for drug poisoning were highest among residents in micropolitan communities and lowest in large central metropolitan communities.⁸ Understanding these trends is critical for developing tailored interventions.

Frontier living represents unique challenges to healthcare. Approximately 12.2 million people live in geographical locations considered to be frontier and remote level one.¹⁰ This is defined as a geographical location that is more than 60 minutes away from urban areas of 50,000 or more people.⁹ South Dakota ranks in the top five states for the proportion of the population living in frontier and remote locations and in the proportion of land classified as frontier and remote. These locations are far from healthcare facilities that provide advanced medical procedures; thus, this population may be at a higher risk for medical and mental health conditions given the reduced access to treatment.

The CDC reported that three out of five patients who died of a drug overdose had prior intervention opportunities.¹¹ The emergency department provides a unique opportunity for interventions to reduce preventable deaths. Understanding trends in emergency department usage for substance use and suicidal ideation is critical for training frontline healthcare workers and developing tailored interventions. In the current study, emergency department utilization was examined in South Dakota for substance use disorders and suicidal ideation in frontier and non-frontier patients. One objective of this study was to identify differences in emergency department visits for substance use disorders and suicidal ideation in patients residing in frontier and non-frontier settings. A second objective was to determine if substance use, frontier residence, or health professional shortage areas increased the odds of suicidal ideation.

Methods

Syndromic surveillance data was retrieved from the South Dakota Department of Health (SDDOH) from Jan. 1, 2017 to Dec. 31, 2018, for this retrospective cross-sectional study. Syndromic surveillance conducted by the SDDOH is an integral part of public health monitoring. Briefly, electronic health records from emergency departments are sent to the state for review to enable near real-time monitoring of diseases and other indicators of health. This statewide sample was chosen to reduce selection bias. Although most emergency departments participated, not all emergency departments in the state participated in the syndromic surveillance system at the time of data collection. Data included 575,904 records from contributing emergency departments in South Dakota. Of those records, approximately 99 percent had either a completed discharge diagnosis or chief complaint. This included 97 percent with a non-missing chief complaint and 66 percent with a non-missing discharge diagnosis. Given the missing discharge diagnosis fields, initial attempts were made to categorize observations based on chief complaints. However, chief complaints are open text fields to document the reason a person *seeks* medical attention, not necessarily what the person was diagnosed with. These fields often contain non-standard abbreviations, misspellings, or symptoms instead of diagnoses.²² However, discharge diagnosis, where standardized codes are used, may be delayed or omitted because emergency departments are awaiting final test results such as drug testing. Still, prior studies have found that using discharge diagnosis from syndromic surveillance when compared to chart reviews offers both high accuracy and sensitivity of diagnosis.^{23,24} Chief complaints alone resulted in the lowest accuracy and sensitivity.²⁴ Based on these previous studies and to maximize the accuracy of

our findings, records with no ICD-10 or invalid discharge diagnosis were removed from the dataset resulting in 372,959 records. Of all emergency department visits not included in this analysis, 23.5 percent were from frontier areas, while 37.2 percent were from non-frontier locations. ICD-10 codes were then queried and labeled for substance use disorder-related events or suicidal ideation events via the Python SNOTRA package. The ICD-10 codes queried were similar to those described in prior studies.¹² Codes included alcohol (F10), opioids (F11), cannabis (F12), sedatives (F13), cocaine (F14), stimulants (F15), hallucinogens (F16), nicotine (F17), inhalants (F18), psychoactive substances (F19), and suicidal ideation (R45.851). Age, gender, and patient zip code were included in the dataset. Frontier level one status¹⁰ and health professional shortage areas status (HPSAs)¹³ were derived from the patient residence zip codes.

Chi-squared analysis was utilized to assess for differences in substance use disorders and suicidal ideation measures by frontier status using SAS Studio (372,959 syndromic surveillance records included). Posthoc analysis was completed using a Bonferroni adjustment. For logistic regression analysis, suicidal ideation cases ($n = 4108$) were matched by age and sex. Only cases where both age and sex were reported in the syndromic surveillance record were included, resulting in the exclusion of 8 cases and 127 potential controls. Stepwise selection of predictor variables was performed. Findings were considered significant when $p \leq 0.05$.

Results

Demographic information is found in Table 1. Results suggested the patients utilizing the emergency department from frontier areas are more likely to be older ($\chi^2(7) = 1796.84$, $p < 0.05$). A slightly higher proportion of emergency department visits were male patients from frontier areas compared to non-frontier areas ($\chi^2(2) = 92.93$, $p < 0.05$).

Overall, emergency department visits for substance use-related reasons differed between patients residing in frontier vs. non-frontier regions ($\chi^2(2) = 594.4$, $p < 0.05$). Posthoc analysis revealed a higher proportion of visits with a single substance use disorder (Frontier: $n = 7,750$, 5.8 percent vs. Non-Frontier: $n = 9,696$, 4.1 percent) and polysubstance use (Frontier: $n = 607$, 0.5 percent vs. Non-Frontier: $n = 885$, 0.4 percent) in patients residing in frontier locations. Most types of substance use disorder diagnoses were similar in patients who live in frontier locations compared to non-frontier locals (Table 2). The exception was nicotine use, where the percentage of patients with nicotine use (F17) was 2.4 times higher in people residing in frontier

locations than non-frontier. Psychoactive substance use and cocaine use diagnoses were slightly higher in patients living in non-frontier areas than frontier locations. Opioid, inhalant, hallucinogen, sedatives, cannabis, and stimulant use diagnoses made up similar percentages of emergency department visits in frontier and non-frontier patients. A trend towards lower cannabis use in frontier patients also was observed ($p = 0.07$). Of interest, alcohol (F10) was noted in approximately 2.5 percent of visits from both frontier and non-frontier patients.

Suicidal ideation was also significantly higher in patients residing in frontier locations ($\chi^2(1) = 34.6$, $p < 0.05$; Odds Ratio: 1.2, 95 percent confidence limits: 1.1 to 1.3). Suicidal ideation was reported in approximately 1.2 percent ($n = 1,658$) of emergency department visits in patients residing in frontier locations compared to 1.0 percent ($n = 2,458$) of visits in patients residing in non-frontier locations.

To further explore the suicidal ideation emergency department visits, logistic regression was performed using patients with a suicidal ideation diagnosis and controls matched by age and sex (1 case: 1 control). Table 1 describes the demographic information of the cases and controls selected. Stepwise variable selection resulted in the inclusion of psychoactive substance use, nicotine use, cannabis use, alcohol use, opioid use, stimulant use, and frontier status as predictor variables ($\chi^2(7) = 451.5$, $p < 0.05$). Substance use increased the odds that the patient exhibited suicidal ideation (Table 3). Patients residing in frontier locations also exhibited higher odds of expressing suicidal ideations.

Table 1. Demographic information for records included in analyses.
Cells contain the sample size (% of visits).

Demographic information	Number of non-frontier visits (% of 239,043 visits)	Number of frontier visits (% of 133,916 visits)	Number visits with no suicidal ideation (% of 4,108 visits)	Number of visits suicidal ideation (% of 4,108 visits)
Sex				
Female	130,458 (54.6)	70,889 (52.9)	2,160 (52.6)	2,160 (52.6)
Male	108,581 (45.4)	63,025 (47.1)	1,948 (47.4)	1,948 (47.4)
Unknown	4 (< 0.01)	2 (< 0.01)		
Age category				
0 - 14 years old	39,204 (16.4)	22,459 (16.8)	531 (12.9)	531 (12.9)
15 - 24 years old	32,933 (13.8)	16,927 (12.6)	1,420 (34.6)	1,420 (34.6)
25 - 34 years old	35,703 (14.9)	17,442 (13.0)	849 (20.7)	849 (20.7)
35 - 44 years old	30,181 (12.6)	14,540 (10.9)	555 (13.5)	555 (13.5)
45 - 54 years old	26,202 (10.0)	13,205 (9.9)	383 (9.3)	383 (9.3)
55 - 64 years old	25,961 (10.9)	14,879 (11.1)	254 (6.2)	254 (6.2)
65 + years old	48,662 (20.4)	34,436 (25.7)	116 (2.8)	116 (2.8)
Unknown	197 (0.1)	28 (0.02)		

Discussion

The current study sought to understand emergency department utilization for substance use and suicidal ideation in South Dakota. Overall, patients residing in frontier locations had a higher percentage of visits for a single substance use disorder and polysubstance use. This increase was likely mediated by higher nicotine use among patients residing in frontier and remote areas. The South Dakota Youth Tobacco Survey found higher e-cigarette uses among rural students than urban students.¹⁴ Similarly, rural high school students had higher cigarette and smokeless

Table 2. The number (percentage) of emergency department visits for substance use disorders in patients residing in frontier and non-frontier settings.

Substance category (ICD 10 code)	Number of non-frontier visits (% of 239,043 visits)	Number of frontier visits (% of 133,916 visits)	$\chi^2(1)$	P-value
Alcohol (F10)	6,028 (2.5)	3,399 (2.5)	0.1	ns
Opioid (F11)	310 (0.1)	181 (0.1)	0.2	ns
Cannabis (F12)	504 (0.2)	245 (0.2)	3.3	$p = 0.07$
Sedatives (F13)	66 (0.03)	27 (0.02)	1.9	ns
Cocaine (F14)	52 (0.02)	13 (0.01)	7.2	$p < 0.05$
Stimulant (F15)	681 (0.3)	388 (0.3)	0.3	ns
Hallucinogen (F16)	16 (0.01)	8 (0.01)	0.1	ns
Nicotine (F17)	3,435 (1.4)	4,528 (3.4)	1,552.8	$p < 0.05$
Inhalant (F18)	24 (0.01)	15 (0.01)	0.1	ns
Psychoactive (F19)	479 (0.2)	229 (0.2)	3.9	$p < 0.05$

Table 3. Predictor variable and odds ratio estimate of variables included in logistic regression of suicidal ideation.

Model variables	Number of visits with no suicidal ideation (% of 4,108 visits)	Number of visits with suicidal ideation (% of 4,108 visits)	Odds ratio estimate	95% Wald confidence limits of odds ratio	
Alcohol (F10)					
No	3,973 (96.7)	3,502 (85.3)			
Yes	135 (3.3)	606 (14.8)	4.6	3.8	5.6
Opioid (F11)					
No	4,104 (99.9)	4,054 (98.7)			
Yes	4 (0.1)	54 (1.3)	10.3	3.7	28.8
Cannabis (F12)					
No	4,092 (99.6)	3,976 (96.8)			
Yes	16 (0.4)	132 (3.2)	5.9	3.4	10.0
Stimulant (F15)					
No	4,098 (99.7)	3,947 (96.0)			
Yes	10 (0.2)	161 (3.9)	12.0	6.3	23.0
Nicotine (F17)					
No	4,001 (97.4)	3,857 (93.9)			
Yes	107 (2.6)	251 (6.1)	1.8	1.4	2.3
Psychoactive (F19)					
No	4,098 (99.8)	4,031 (98.1)			
Yes	10 (0.2)	77 (1.9)	6.0	3.0	11.8
Frontier					
No	2,719 (66.2)	2,451 (59.7)			
Yes	1,389 (33.8)	1,657 (40.3)	1.3	1.2	1.4

tobacco use than students in urban locations.¹⁵ Disparities in nicotine use among rural, frontier, and remote locations may emerge in youth and persist leading to an overall higher nicotine use rate in rural settings.

Two categories of substance use disorders were higher among patients residing in non-frontier settings. Cocaine emergency department visits, although rare overall, were higher in non-frontier settings. This is consistent with prior studies showing that cocaine overdose mortality was higher in urban settings than in rural areas.¹⁶ Psychoactive substance use emergency department visits were also higher in non-frontier residing patients compared to frontier patients. A trend towards a higher percentage of cannabis emergency department visits was observed in non-frontier patients compared to frontier patients. As South Dakota readies to legalize marijuana, increases in cannabis-related emergency department visits will likely occur.

A substance use disorder diagnosis increased the odds of patients exhibiting suicidal ideation. Alcohol, opioid, cannabis, stimulant, nicotine, and psychoactive substance use all increased these odds. With the legalization and decriminalization of cannabis in this state and others, monitoring the co-occurrence of suicidal ideation and cannabis use will become increasingly important. In Colorado, where marijuana is legal, an increasing proportion of suicides have tested positive for the drug.¹⁷ Similarly, among those who have died by suicide in 34 states across the U.S., 40 percent tested positive for alcohol, 12 percent tested positive for amphetamines, 22.6 percent tested positive for marijuana, and 25.2 percent tested positive for opioids.¹⁸ Systematic reviews of suicide deaths also found that substance use is a risk factor for suicide.¹⁹ Emergency department visits may represent a critical opportunity for interventions for both serious mental illness and substance use disorders.

Barriers to healthcare access also increased the odds of suicidal ideation. Frontier status increased the odds of the patient seeking emergency attention for suicidal ideation. Access to mental health resources is often limited in rural areas.²⁰ Among rural non-core areas, 80 percent of these rural counties are without a psychiatrist, 61 percent are without a psychologist, 35 percent lack a social worker, and 24 percent lack a counselor.²¹ Reduced access to mental health professionals may influence the need to seek treatment in emergency settings. With expanded use of telehealth, monitoring these trends will become increasingly important.

Limitations

The current study is not without its limitations. Only South

Dakota emergency department visits were included in this study. As discussed above, not all emergency departments participated in the syndromic surveillance program during this time or may have utilized alternative coding systems such as SNOMED CT, especially in non-frontier settings. The state has a high proportion of residents living in frontier designated areas and may not generalize to other areas of the country. Lastly, emergency departments are only one source of treatment for substance use and mental health crises. Future studies are necessary to examine if these findings persist when examining other treatment locations, such as office visits.

Conclusions

The current study sought to investigate emergency department usage related to substance use disorders and suicidal ideation in frontier and non-frontier settings in South Dakota. Overall, patients residing in frontier classified zip codes had higher nicotine use and lower cocaine use than non-frontier settings as measured by ICD-10 codes. However, other categories of substance use disorders were similar between the frontier and non-frontier patients. Finally, substance use and frontier status increased the patient's odds of reporting suicidal ideation in the emergency department. Given most forms of substance use and suicidal ideation were similar or higher in frontier patients and access to mental healthcare may be limited, novel strategies may be needed to address these needs. Expanding access to treatment for substance use and mental health, especially in frontier and remote areas, is critical to aid patients in these geographical regions. The expansion of telehealth may represent an opportunity to improve access to the treatment of mental health and substance use disorders in these underserved areas.²⁰

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Statin Induced Immune Mediated Necrotizing Myopathy: More Than Just Sore Muscles

Jazmin Newton, MS IV; and Matthew Simmons, MD, FAAN

Abstract

Statin drugs are commonly used to decrease levels of triglycerides and cholesterol. Common side effects of this medication class are generally mild and include headache, nausea, diarrhea, and myalgia. Rarely, statins have been associated with autoimmune disease resulting in a potentially serious inflammatory myopathy known as statin-induced immune-mediated necrotizing myopathy (IMNM). Here, we describe a case of statin-induced IMNM in a 66-year-old man placed on atorvastatin several months prior to CABG surgery. We review the relevant laboratory results, imaging, immunologic, histopathologic findings and treatment strategy of this important disorder.

Introduction

Statin drugs are a commonly used class of drugs that decrease levels of triglycerides and cholesterol. They work by inhibiting the rate limiting enzyme in the cholesterol biosynthesis pathway, 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase, thereby inhibiting cholesterol synthesis. They are commonly prescribed to patients with cardiovascular disease or risk factors that put them at increased risk for myocardial infarction or ischemic stroke.¹ Common side effects of this medication class are generally mild, including headache, nausea, diarrhea, and a spectrum of myotoxicity of which myalgia is most common. The myotoxicities are generally attributed to interruption of the cholesterol biosynthetic pathway, which causes upregulation of cholesterol biosynthetic genes, leading to reduced skeletal muscle size, protein synthesis, and muscle atrophy.² Rarely, statin drugs are associated with a distinctive autoimmune disease resulting in potentially serious inflammatory myopathy.¹ This phenomenon is known as statin-induced immune-mediated necrotizing myopathy (IMNM). Statin-induced IMNM is a progressive myopathy resulting in symmetrical proximal muscle weakness associated with extreme elevations in creatine kinase (CK).¹ Discontinuation of the statin alone is insufficient in reversing this disorder. In most cases, immunosuppressants are required for successful treatment. Here, we describe a case of statin induced IMNM.

Case Report

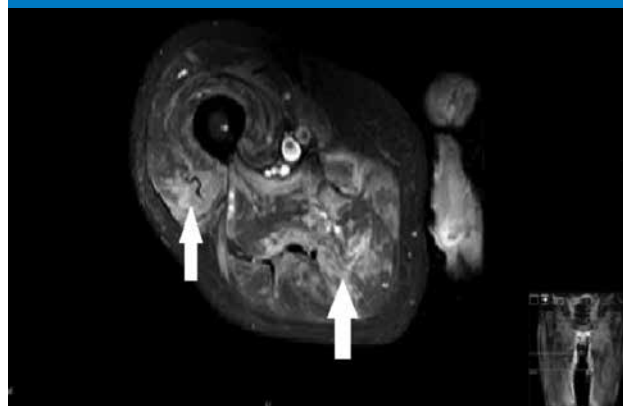
A 66-year-old man was diagnosed with dyslipidemia and coronary artery disease. He was placed on atorvastatin several months prior to CABG surgery. While in hospital

for CABG post-operative care, the patient complained of myalgias and weakness. The initial creatine kinase (CK) obtained nine days postoperative was 14,680 U/L (Normal 39-308 U/L). Atorvastatin was discontinued. Despite discontinuation of atorvastatin, patient had progressive weight loss, muscle weakness, and atrophy. CK 29 days postoperative was 11,794 U/L and exam showed proximal weakness at 3/5 in the upper extremities and 3-/5 with hip flexion. Distal strength was relatively intact. MRI of muscles in thighs revealed an extensive myositis pattern with intramuscular edema and enhancement of imaged muscles. (see image 1). Muscle biopsy completed 33 days following CABG was consistent with necrotizing myopathy demonstrating predominantly perivascular inflammation and some denervation atrophy. (Figure 2) HMG-CoA reductase antibody titer was markedly positive at 206 CU (normal less than 20 CU). Myomarker antibody panel was negative for other muscle related antibodies. ANA was positive in titer of 1:160 with homogeneous pattern. Extractable nuclear antigen was negative. Following diagnosis of IMNM and considering the severity of weakness in this post-operative patient he was treated with IVIG 0.4 grams/kg daily for five days followed by IVIG 0.4 grams/kg three days monthly for three months. Prednisone and azathioprine were started simultaneously with IVIG. Initial azathioprine dose at 50 mg twice daily for one month, then increased to a maintenance dose of 75mg twice daily. Prednisone was initiated at 50 mg per day and gradually tapered off over nine months. The patient steadily improved with treatment. At five months post diagnosis, the CK was normal and patient had nearly full recovery of muscle strength. Motor strength remained

Figure 1A: Image of right femur demonstrating hyperintense muscle signal and enhancement consistent with edema and inflammatory myopathy (arrows).



Figure 1B: Image of right femur demonstrating hyperintense muscle signal and enhancement consistent with edema and inflammatory myopathy (arrows).



stable after tapering off prednisone. If patient remains stable, two to three years of treatment with azathioprine is expected before attempting to wean off.

Following discontinuation of atorvastatin, lipid panel showed triglycerides 215 mg/dL, cholesterol 218 mg/dL, HDL 63 mg/dL, and LDL 112 mg/dL. Evolocumab was initiated at 140mg subcutaneously every 14 days. Follow up lipid panel showed triglycerides 105 mg/dL, cholesterol 120 mg/dL, HDL 54 mg/dL, and LDL at 45 mg/dL.

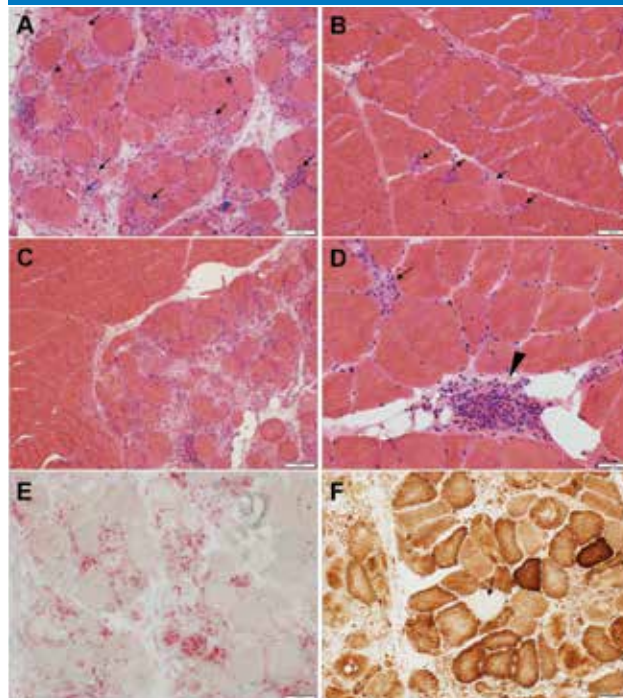
Discussion

Most inflammatory myopathies, including statin-induced IMNM, are characterized by progressive symmetrical proximal muscle weakness and extremely elevated CK.¹ Pathophysiology for statin-induced IMNM is poorly understood but most research suggest the disease is caused by anti-HMG-CoA reductase antibodies within muscle cells, in contrast to the T-cell-mediated attack on muscle cells present in dermatomyositis and polymyositis.^{3,4} In addition to statin-related IMNM, IMNM may be associated with malignancy, viral infections (HIV or hepatitis C), or other connective tissue diseases (i.e., scleroderma).⁵

Onset of IMNM can occur weeks, months, or even years after starting statin therapy, highlighting the unpredictable nature of the disease. Statin-induced IMNM is a rare side effect of statin therapy estimated at two to three cases per 100,000 statin users.⁴ Muscle biopsy IMNM shows macrophages and necrotic muscle fibers undergoing phagocytosis.^{1,6} Diagnosis is confirmed by testing for the anti-HMG CoA reductase autoantibody. In antibody-negative patients, other diagnoses should be strongly considered, as approximately one-third of cases of IMNM have no autoantibodies identified which

Figure 2A-F: Patient's muscle biopsy. Hematoxylin eosin stained sections (A-D) showing numerous fibers in various stages of necrosis (black arrows), rare regenerating fibers (A, blue arrow), fibers with non-rimmed vacuoles (A, blue arrowhead), muscle fiber size variability, fibers subdividing by splitting (A, asterisk), and increased endomysial connective tissue. The structural abnormalities were patchy with some areas of the specimen being severely affected (A), other areas showing few scattered necrotic fibers (B) and other areas being almost unaffected (C, left side of the photograph). Rare inflammatory cells were present in proximity of necrotic fibers or occasionally at perivascular sites (D, arrowhead) in the perimysium. Acid phosphates stained section (E) demonstrating macrophages (in red) invading numerous necrotic fibers. Cytochrome c oxidase stained section (F) revealing a cytochrome c oxidase-negative fiber (arrow). (Magnification: A, B, E, F: 10x; C, 5x; D, 20x).

Courtesy of Dr. Margherita Milone, muscle pathology laboratory, Mayo Clinic, Rochester, Minnesota



may implicate alternate autoantibodies not yet discovered.⁴

Presently, there are no specific evidence-based guidelines on statin-induced IMNM treatment. Antibody production can persist long after statin cessation, so very few cases of IMNM will resolve with statin cessation alone.^{3,4,7} Experts typically recommend immunomodulating or immunosuppressant medications.^{1,8} Some propose combination therapy with high-dose glucocorticoids, methotrexate, azathioprine, or IVIG to be more efficacious in sustaining remission.^{4,7-9} Treatment response varies but recent reviews including longitudinal studies suggest that with immediate statin discontinuation, steroids, and immunosuppressive therapy,^{4,7} prognosis is usually favorable.⁹ Relapses of IMNM are uncommon and immunosuppression treatment beyond two to three years is usually not necessary.^{4,9}

The use of pharmacogenetic testing has been implemented in the use of statins to identify patients who are at risk for myotoxicity.^{11,12} Currently, presence of the *SLCO1B1* gene and missense variant rs4149056 are associated with increased risk of myotoxicity when treating with simvastatin but no consistent association with the other statins including atorvastatin.^{11,12} Some studies have suggested an increased presence of HLA allele DRB1*11:01 in patients with statin associated IMNM.¹

Conclusion

Statins are currently among the most significant medications used in the primary and secondary prevention of cardiovascular disease. While these drugs are generally well tolerated, they can cause a spectrum of adverse muscle effects including myalgias, myopathy, myositis, and rhabdomyolysis.^{10,13} Aside from IMNM, most other muscle-

related adverse effects related to statin use resolve with cessation of statin use alone. The diagnosis of statin-induced IMNM relies primarily on detection of antibodies against the enzyme HMG-CoA reductase. Questions remain regarding the epidemiology, pathogenesis, genetic predisposition, and optimal treatment of statin associated IMNM. Future studies will be needed to address these issues in order to further reduce the risks related to statin treatment.

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Comparing Travel Distance to Care and Staging of Parotid Gland Malignancies in South Dakota and Surrounding States

Chandler Jansen, MD; Jordan Dykstra, MD; Colby Felts, MD; Alexander Graves, MD; and William Spanos, MD

Abstract

Background: Parotid gland malignancies are difficult to characterize in terms of incidence and risk factors due to their relatively rare occurrence. Common cancers often present more aggressively in rural areas, albeit occurring less frequently. Some previous studies have found increased distance to care has been linked to more advanced malignancies. This study hypothesized decreased access to parotid gland malignancy specialists (otolaryngologists or dermatologists), evaluated as longer travel distances, would be associated with more advanced staging of parotid gland malignancies.

Methods: A retrospective chart review of the Sanford Health system electronic medical record in South Dakota and surrounding states from 2008-2018 was conducted to obtain data of parotid gland malignancies, respective staging, and patient home addresses to assess distance, both driving and straight-line, to the nearest parotid gland malignancy specialist, including outreach clinics. Travel distance was categorized (0-20 miles, 20-40 miles, and 40+ miles) and compared to categorized tumor stage (early 0/I, late II/III/IV) using a Fisher's Exact test.

Results: Overall, chart review yielded 134 patients with parotid gland malignancies from 2008-2018 in the Sanford Health system and associated data was gathered. The malignancies were categorically organized as 52.3 percent in early stage (0/I) vs. 47.7 percent in late (II/III/IV). When comparing parotid malignancy stage to driving distance, no significant association was found when outreach clinics were excluded ($p=0.938$) or included ($p=0.327$). When comparing parotid malignancy stage to straight-line distance, no significant association was found when outreach clinics were excluded ($p=0.801$) or included ($p=0.874$).

Conclusions: Although no association was established between travel distance and parotid gland malignancy staging, further studies are needed to evaluate at population levels the incidence of parotid gland malignancies in rural communities and if there are specific risk factors in these areas for these malignancies which is currently unknown.

Introduction

Parotid gland tumors, which represent roughly 70-75 percent of total salivary gland tumors, have been difficult to epidemiologically characterize due to their relatively low incidence.^{1,2} The overall incidence of these tumors, both malignant and benign, is around 1 per 100,000 people.¹ Approximately 80 percent of those tumors are benign, emphasizing the rarity of malignant parotid tumors.³ Determining risk factors and other public health data is challenging given the relatively low rates of occurrence. Research on salivary gland malignancies has reported five-year survival rates of 96 percent, 77 percent, 73 percent, and 37 percent at Stage I, II, III, and IV respectively.² This emphasizes the importance of attempting to identify risk factors for advanced stage parotid gland malignancies given the decreased rates of survival.

Prior research has suggested certain exposures and occupations are risk factors for salivary gland tumors. To date, ionizing radiation is the most well characterized risk

factor. Atomic bomb survivors in Japan have been shown to have increased risk of both malignant and benign salivary gland tumors.⁴ Other studies have evaluated UV radiation as a risk factor, with Spitz et al. showing an increase of in salivary gland malignancies in the southern United States as compared to central and northern regions.⁵ Other possible less characterized risk factors include rubber manufacturing, asbestos mining, plumbing, and cell phones.⁶⁻⁸

Rurality is another potential risk factor which has been associated with other cancers. Although cancer incidence for most malignancies is lower in rural areas as compared to metropolitan areas, mortality rates are higher in rural areas according to CDC statistics.⁹ Several sociodemographic factors, including those more commonly found in rural areas, have been associated with altering access to care as well as effecting almost all areas of disease management.^{9,10} Travel distance is a potential risk factor which has had mixed results on its role in cancer outcomes. Several studies have shown a correlation with greater travel distance and more

severe disease including both increased Breslow thickness of melanomas and more advanced stage of laryngeal cancer.^{10,11} However, other studies have not found the same associations with other malignancies.^{12,13}

Given the above information, the research team felt a study analyzing parotid gland malignancies would be prudent since some providers in the Sanford Health system subjectively felt parotid gland malignancies were occurring more frequently than expected. The Sanford Health system has a large rural patient population and access to specialty providers in these rural settings is limited. Assessment of these malignancies and their risk factors undoubtedly consists of a multitude of potential risk factors. This study chose to analyze travel distance (both driving and straight-line) for evaluation. Our hypothesis is decreased access to parotid gland malignancy specialists (otolaryngologists or dermatologists), evaluated as longer travel distances, would be associated with more advanced staging of parotid gland malignancies.

Methods

The study designed was established and received both Sanford Health and University of South Dakota Institutional Review Board approval. A retrospective electronic medical record (EMR) chart review was conducted of the Sanford Health EMR to identify patients diagnosed with primary parotid gland tumors between 2008 and 2018. A 10-year period was chosen to attempt and establish adequate study power for statistical analysis of this relatively uncommon diagnosis. Records were searched using International Classification of Diseases, Tenth Revision code C07 for “malignant neoplasm of the parotid gland.” The Sanford Health system spans multiple states so results included South Dakota, North Dakota, Minnesota, and Montana. Information of patients with primary parotid gland malignancies was gathered, including the stage of cancer and patient home addresses. Information was gathered manually by the lead medical student on the project and transferred to an encrypted spreadsheet. Malignancies were classified into early (stage 0/I) and late (stage II/III/IV) stage. Patients missing stage data were excluded from the study.

Access to care was evaluated as the distance from a patient’s home address to the nearest parotid gland malignancy specialist which included both primary clinics and outreach clinics. A clinic was designated as a primary clinic if the site was the main site of operation for the specialist. Otolaryngologists were considered the primary parotid gland malignancy specialist. However, if the patient had a primary squamous cell carcinoma of the parotid gland, dermatologists were added to examine for a history of cutaneous squamous cell carcinoma. This was because squamous cell carcinoma of the parotid gland is more commonly from metastatic spread of a cutaneous squamous cell carcinoma compared

to a primary parotid gland neoplasm. National Provider Identifier (NPI) was used to identify both otolaryngologists and dermatologists closest to patients’ addresses including both primary and outreach clinics. This analysis used NPIdb.org to identify these individuals. Outreach clinics were identified via system and provider websites.

Travel distance to care was calculated using both driving and straight-line distances. The data was generated twice with outreach clinics both excluded and subsequently included. Both driving distance and straight-line distance were calculated using RStudio, Version 1.3.1093 with the maps package for plotting latitude-longitude points, and ggmap package to measure distance between those points. Travel distance was categorized into three ranges: 0-20 miles, 20-40 miles, and 40+ miles.

A Fisher’s exact test was used to compare categorical distances against categorical stages of malignancy for statistical analysis. P values were generated for significance with an alpha of 0.05. The analysis was completed for both driving and straight-line distance as well as including and excluding outreach clinics. A G*Power program was used to achieve the Power of the study.

Results

A retrospective chart analysis yielded 134 patients in the Sanford Health System diagnosed with a primary parotid gland tumor between 2008 and 2018.

The 134 malignancies were categorically organized as 52.3 percent in early stage (0/I) vs. 47.7 percent in late (II/III/IV). Of the 31 patients diagnosed with squamous cell carcinoma of the parotid gland, 78.6 percent had a history of documented cutaneous squamous cell carcinoma.

Fisher’s exact test did not show statistically significant associations between straight-line distance and staging of primary parotid gland malignancies both when outreach clinics were excluded ($p=0.938$) and included ($p=0.327$).

Fisher’s exact test did not show statistically significant associations between driving distance and staging of primary parotid gland malignancies both when outreach clinics were excluded ($p=0.801$) and included ($p=0.874$). Post-hoc power achieved was 85.59 percent Power, resulting in a type II error rate of 14.41 percent.

Patient addresses obtained through chart review were used to create heat maps to identify the counties with high numbers cases of parotid tumors. Figure 1 displays absolute case locations and surrounding clinics of parotid tumor malignancies in South Dakota and surrounding states for data within our study. Figure 2 shows prevalence of parotid gland malignancies in comparison to published county population data.

Discussion

Our findings are consistent with the mixed results of previous studies which analyzed travel distance as a risk factor in severity of disease. While increased distance may be a challenge of receiving healthcare, it is not definitely associated with a known delay in receiving healthcare resulting in more severe disease. The implications of this are unclear and may be pathology specific. While disease risk factors are multifactorial, including those unique to rural areas, one method to reduce the challenge of travel is the use of outreach clinics. The easier access to specialists may provide care to patients who would not have traveled further.

This study has several strengths. First is the large sample size for a relatively rare diagnosis. Second is the wide geographic area analyzed. These are due to the large size of the Sanford Health system as well as analyzing cases within 10-year time frame. A final strength is the variety of analysis which included both primary and outreach clinics as well as both driving and straight-line distance.

This study also has several limitations. First, we only analyzed distance to the closest NPI providers instead of how far the patients traveled for care. Second, the chart review is only representative of the Sanford Health system and not population level analysis. This did not allow us to truly examine incidence levels which was part of the reason the study was initiated. Finally, patient addresses were accurate at time of data review but could have been different at time of diagnosis.

As current and future healthcare providers in this predominately rural region, it is important to continually analyze the unique role our geographic distribution can have in our patients' health. Travel distance is just one of these potential challenges. Although our research found no association between travel distance and staging of primary parotid gland malignancies, many other potential risk factors exist for future analysis. One area is population level research to better understand incidence levels. Another area of research is analyzing patients use of primary care providers in areas where access to specialists is a challenge. A final area of consideration is analysis of potential occupation or chemical risk factors with primary parotid gland malignancies.

Conclusion

This study was originally developed because many patients in the Sanford Health system live in rural communities and access to specialty providers in these rural settings is limited. Subjectively, some providers in the Sanford Health system felt parotid gland malignancies were more common than usual. The study attempted to evaluate these rates and hypothesized further distance to care would be associated with more advanced stages at diagnosis. Our data showed

Figure 1. Heat map demonstrating absolute number of parotid tumor cases by county population. Icons on the map demonstrate clinic sites with stars indicating Sanford clinics and dots non-Sanford clinics.

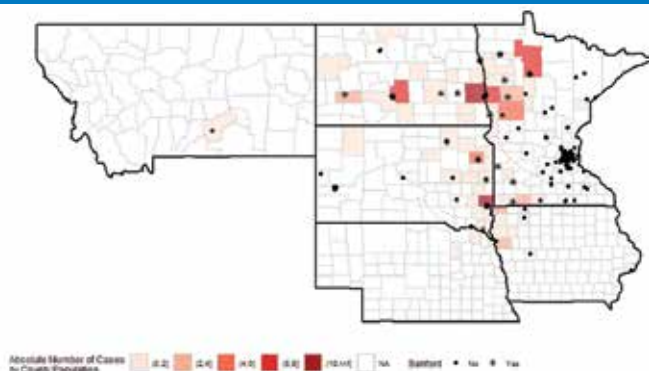
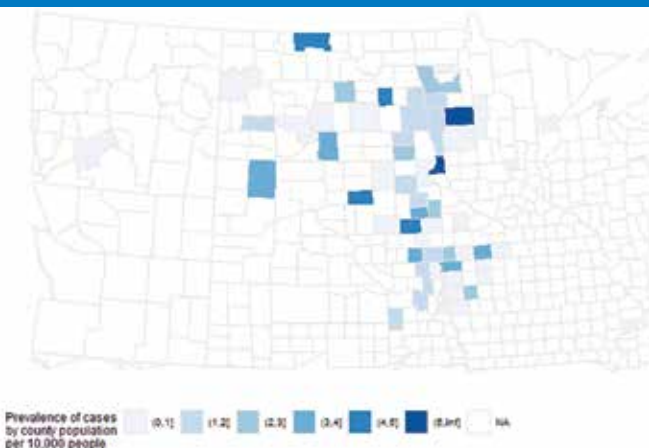


Figure 2. Heat map demonstrating the prevalence of parotid tumor cases by county population.



travel distance to care had no significant association with the stage of parotid gland tumors at presentation. Further studies are needed to evaluate at population levels the incidence of parotid gland malignancies in rural communities and if there are specific risk factors in these areas for these malignancies which are currently unknown.

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PREVENT CONGENITAL SYPHILIS

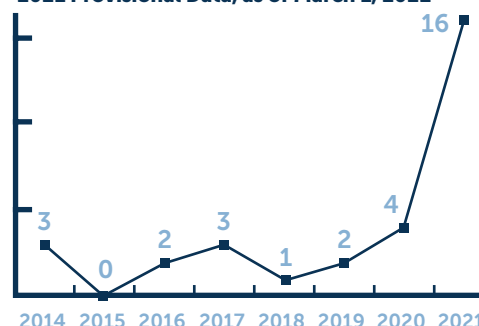
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16 Congenital syphilis cases reported to SD-DOH in 2021.

This represents a **700%** increase from the 5-year median.

2021 Provisional Data, as of March 1, 2022



PREGNANT MOTHER

TEST

TEST all pregnant women for syphilis at their first prenatal visit.

RE-TEST

RE-TEST all pregnant women at risk at 28 weeks AND again at delivery, including births, stillbirths, or terminations.

TREAT

TREAT* all women with diagnosed or suspected syphilis **immediately** using long-acting benzathine penicillin G; test & treat sex partner(s).

*[CDC.gov/std/treatment](https://www.cdc.gov/std/treatment)

NEONATE

TEST

TEST and examine all neonates born to mothers who have reactive nontreponemal and treponemal test results. Neonate's serum should be used for quantitative nontreponemal test.

RE-TEST

RE-TEST and examine all neonates with reactive nontreponemal tests every 2-3 months until the test becomes nonreactive.

TREAT

Maternal history of syphilis infection and treatment should be considered when **TREATING the neonate**. If mother's full history is unknown work with your local Disease Intervention Specialist to gather additional history.



Local disease intervention specialists can **SUPPORT YOU** with **gathering patient testing and treatment history** and with **partner notification**.

Case Report of Hemosuccus Pancreaticus as a Result of Endovascular Coil Erosion

Spencer J. Lucas, MS IV; and Hassan Turaihi, MD

Abstract

Background: Hemosuccus pancreaticus (HP) remains one of the rarest causes of gastrointestinal (GI) bleeding. Due to its rarity, diagnostic and treatment strategies for this condition remain poorly defined. Endoscopy is commonly inconclusive as the hemorrhaging from the papilla of Vater is intermittent.

Case Summary: We describe a 36-year-old female with a remote history of alcoholic pancreatitis who presented with a two year history of recurrent gastrointestinal hemorrhages requiring frequent admission to the intensive care unit and frequent blood transfusion. She had undergone eight endoscopies in two years. Despite undergoing four endovascular procedures including coiling of the left gastric artery and microvascular plugging of the gastroduodenal and supraduodenal artery, her symptoms failed to resolve. She subsequently underwent surgical pancreatectomy which resulted in complete resolution of her bleeding.

Conclusion: GI bleeds resulting from hemosuccus pancreaticus can often go undiagnosed following multiple negative workups. Diagnosis of HP is often through endoscopic imaging along with radiological evidence. Endovascular procedures are useful treatments in certain populations. Pancreatectomies are recommended after all other therapeutics fail to resolve the bleeding.

Introduction

Hemosuccus pancreaticus (HP) is described as gastrointestinal (GI) bleeding from the papilla of Vater via the pancreatic duct. Based on limited data, HP has an incidence of 1 in 1,500 cases of GI bleeding.¹ Current evidence suggests the average age of onset is between 32 and 36 years old. Women are approximately five times more likely to suffer from HP. There are many reported etiologies behind HP. One of the most common causes is rupture of a splenic artery aneurysm as a result of acute or chronic pancreatitis. Pseudoaneurysms of the common hepatic, gastroduodenal, and pancreaticoduodenal arteries have also been reported as a source of bleeding.¹ HP is a condition that remains very challenging to diagnose as a result of its rarity, anatomical location, and intermittent symptomatology. Due to these characteristics, current literature estimates mortality of HP to be 7.8-9.6 percent.^{1,2} Computed tomography angiography (CTA) is the mainstay imaging technique to diagnose these suspected pseudoaneurysms.³ Historical treatment of HP includes treating the underlying cause and surgery, specifically pancreatectomy. With advances in endovascular techniques in the past decade, angioembolization has been shown as an effective first line treatment for non-emergent,

hemodynamically stable patients.⁴ It is becoming increasingly common for patients to undergo pancreatectomies while having coils implanted within neighboring arteries as a result of prior interventions. The purpose of this case report is to discuss a rare and interesting case of hemosuccus pancreaticus that resulted from endovascular coil erosion.

Case

The patient was a 36-year-old female who presented with a long-standing history of alcohol abuse, chronic pancreatitis, and recurrent unexplained GI hemorrhages. The gastroenterology team estimated the patient had received over 44 units of pRBCs, eight endoscopy procedures, and four IR angioembolization in the last two years. She had over ten visits to the emergency department (ED) over that time. CT scans showed recurrent pancreatitis but further workups failed to discover the etiology behind her recurrent bleeding episodes (Figure 1A). In March 2020, CTA showed a large pseudoaneurysm within the pancreatic body arising from the left gastric artery (LGA). She subsequently underwent endovascular coiling of the LGA (Figure 2). The bleeding initially subsided until early 2021, when a CTA noted another pseudoaneurysm within the pancreatic body. She underwent microvascular plug embolization of the gastroduodenal artery

Figure 1A. Coronal view CT scan exhibiting pancreatitis (blue arrow) with associated fat stranding. 1B. Endoscopic image showing bleeding from the ampulla of Vater (asterisk) into the duodenum.



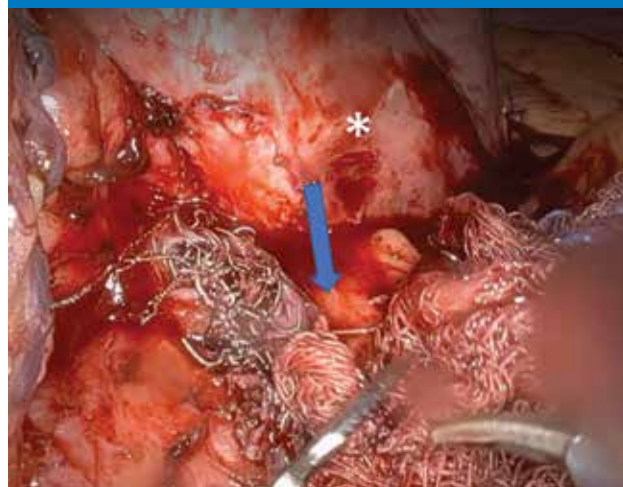
Figure 2. Angiogram of the celiac trunk with endovascular coiling of the left gastric artery pseudoaneurysm.



Figure 3. Angiogram showing complete endovascular micro plugging of the gastroduodenal artery.



Figure 4. Intraoperative photo of the endovascular coils eroding through adjacent pancreas (blue arrow) and the stomach (asterisk).



(GDA) and supraduodenal artery (Figure 3). She again had transient resolution of her symptoms for months afterward. In September 2021, she underwent an EGD with active bleeding noted from the ampulla of Vater (Figure 1B). She was referred to our surgery team for options. CTA had limited exposure of the anatomy as a result of artifact from the endovascular coils. We attempted angiography, which illustrated no arteriovenous malformation (AVM) or any source of bleeding. After exhausting all diagnostic imaging measures, the patient returned to the surgery clinic to discuss her options. She was nondiabetic and did not have a definitive source of bleeding on imaging. She was counseled on the risk of pancreatic insufficiency following distal pancreatectomies. After lengthy discussion, she elected to undergo a robotic distal pancreatectomy with splenectomy.

The patient underwent surgery in November 2021. While intraop, access to the lesser sac was challenging as the posterior wall of the stomach was intimately adhered to the superior portion of the pancreas as a result of the chronic inflammation. Once the lesser sac was opened widely, intraoperative ultrasound was performed to better define the anatomy of the pancreas and associated blood vessels. Exposure of the pancreas was extremely difficult due to the adherence to the stomach. After dissecting to the middle body of the pancreas, metal endovascular coils became clearly visible. These coils were eroding through the splenic artery into the posterior wall of the stomach and neighboring pancreatic duct (Figure 4). While attempting to remove the coil from the stomach, the proximal portion of the splenic artery ruptured, causing life-threatening hemorrhage. Assistant surgeon at the bedside kept pressure. The operation

was transitioned to an open laparotomy. Proximal and distal control was achieved and distal pancreatectomy and splenectomy were performed. Three units of pRBCs were transfused. The patient remained hemodynamically stable throughout the operation. Recovery was unremarkable and the patient was discharged on post op day five after removal of all her surgical drains.

Discussion

Hemosuccus pancreaticus continues to be an extremely rare cause of gastrointestinal bleeding. With this rarity and wide range of severity, comes associated difficulty in diagnosing upon presentation. Previous reported evidence supports prompt angiographic evaluation for all GI bleeds in patients with chronic pancreatitis.⁴ Endoscopy remains an essential diagnostic tool as laboratory values are nonspecific. Due to its intermittent nature, many patients undergo a magnitude of imaging studies and procedures until the diagnosis is definitively made. In retrospect, our patient had been seen in the ED multiple times over a year without definitive

diagnosis. As seen with this patient, who underwent eight endoscopic procedures in two years, HP should remain on every clinician's differential, despite a prior negative EGD. Once a definitive diagnosis was made, the patient was provided expedited treatments in the subsequent visits to the ED.

Our patient is presumed to have developed pancreatitis as a result of chronic alcohol abuse. The continuous inflammation led to subsequent LGA pseudoaneurysm formation, leading to recurrent bleeding. The angiographic interventions were initially successful in resolving the bleeding, but the chronic inflammation from the pancreatitis led to the erosion of her endovascular coils through the splenic artery, leading to more aggressive bouts of HP. Current evidence suggests exhausting interventional radiographic therapies before undergoing surgical treatment.^{4,5} Definitive diagnosis was complicated by the inability for CTA to visualize the precise location due to artifact from the coils. Despite the failure to expose the bleeding on imaging, the decision for surgical treatment was the correct choice. It allowed for full resolution of her bleeding, leading to improvement of her quality of life.

Conclusion

Hemosuccus pancreaticus remains one of the rarest etiologies of gastrointestinal bleeding. Leakage of blood from the ampulla of Vater is commonly recognized as the key diagnostic finding. With its intermittent nature, HP commonly remains undiagnosed until a magnitude of tests have occurred. The vast majority of these patients undergo endovascular treatments with full resolution of the bleeding. But with recurrent pancreatitis, surgeons should remain mindful of the impact of this inflammation on the surrounding tissues.

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Surgical Outcomes in Indigenous Peoples Undergoing Cardiac Surgery

Thomas Vierhout, MD; Morgan Nelson, MS; and Meghana R.K. Helder, MD

Abstract

Introduction: Heart disease is the leading cause of death in indigenous peoples, however cardiac surgical outcomes in this group are rarely studied. We hypothesized that complication rates in indigenous peoples undergoing cardiac surgery would be similar to Caucasians.

Methods: From 2014 to 2020, 1,594 patients underwent cardiac surgery; 36 patients were identified as indigenous peoples. Risk factors, intraoperative, and postoperative variables were abstracted from our institution's database. We used the variables of age, BMI, diabetes, and tobacco use to propensity match the indigenous peoples to a group of Caucasian patients, 1:2, resulting in a total of 107 patients. Logistic regression analysis determined differences in complication rates.

Results: Within the propensity-matched group, indigenous peoples were more likely to be in renal failure requiring dialysis (16.7 vs. 2.9 percent, $p=0.02$). Indigenous peoples had a 30-day mortality of 0 percent while Caucasians had a rate of 4.3 percent ($p=0.55$). Postoperative complication rates were lower in indigenous peoples (22.2 percent) compared to Caucasians (35.3 percent, $p=0.17$). Logistic multivariate regression analysis of complication rate did not yield race as a contributing variable (odds ratio 2.05; $p=0.21$).

Conclusions: Following cardiac surgery, indigenous peoples had a mortality rate of 0 percent and a complication rate of 22 percent. Indigenous peoples had a clinically significant lower complication rate than Caucasians, and race did not play a statistically significant role in complication rates.

Introduction

The presence of cardiovascular risk factors is increased for indigenous peoples, with heart disease noted as the leading cause of death.^{1,2} While some ethnic differences have been noted in surgical outcomes for patients requiring cardiac surgery to address heart disease, there are little data regarding outcomes in indigenous peoples.³ Studying this population can be difficult as only 1.3 percent of the U.S. population identifies as an indigenous person but in South Dakota, 9 percent of the population are indigenous peoples.⁴ In this study, we examined surgical outcomes of indigenous peoples undergoing cardiac surgery at one institution in South Dakota.

Methods

A total of 1,594 patients who underwent cardiac surgery between the years 2014 and 2020 were included in the study. Thirty-six of these patients identified as indigenous and the remainder identified as other races. Cardiac risk factors, operative details, postoperative complications, and outcomes

were identified and collected from our Adult Cardiac Surgery Database for all patients. Chi-square and T-tests were used to assess raw associations of important cardiac risk factors by race. These risk factors included diabetes, dyslipidemia, renal failure requiring dialysis, hypertension, endocarditis, current tobacco use, chronic lung disease, sleep apnea, illicit drug use within the last year, depression, alcohol use of more than one drink per week, immunocompromised status, peripheral artery disease, and cerebrovascular disease.

The indigenous peoples were matched to a control group of Caucasians utilizing a propensity score. Other races were excluded due to their low numbers within the dataset. The indigenous peoples and Caucasians were matched 1:2 using the variables of age, BMI, diabetes, and tobacco use, resulting in a total of 107 patients (one indigenous patient only had one control match). The variables chosen for propensity matching were those that differed significantly in the unmatched populations and could affect cardiac surgery and recovery. We utilized SAS software for matching and

analysis. The SAS software used the variables mentioned above to generate populations of indigenous and Caucasian patients that were comparable in respect to these variables. We did this mainly to isolate the effect of race on outcome. Chi-square and T-tests were repeated for the matched groups to assess associations of important cardiac risk factors by race. Binary logistic regression and Poisson regression models were used to assess the likelihood of having a complication and the number of complications by race, respectively. Thirty-day mortality was also compared between groups. This study was approved by the Avera Institutional Review Board, IRB protocol #2019.077 / 100736.

Results

In the analysis of the 1,594 total patients, indigenous peoples were significantly younger, with an average age of 60.5 years vs. 67.1 years for Caucasians ($p<0.0001$). Indigenous patients had a higher percentage of female patients, with only 61.1 percent of patients being male, compared to 76.6 percent of Caucasian patients being male ($p=0.03$). There was no significant difference in body mass index (BMI) between the groups (indigenous peoples 31.2 vs. Caucasian 30.1; $p=0.25$). In the unmatched groups, the indigenous patients were significantly more likely to have diabetes (72.2 percent vs. 35.2 percent of Caucasians; $p<0.0001$), renal failure requiring dialysis (indigenous peoples 16.7 percent vs. Caucasian 0.7 percent; $p<0.0001$), tobacco use (indigenous peoples 86.1 percent vs. Caucasian 54.5 percent; $p=0.0002$), and depression (indigenous peoples 25 percent vs. Caucasian 12.3 percent; $p=0.04$). There were no significant differences in rates of dyslipidemia (indigenous peoples 77.1 percent vs. Caucasian 76.2 percent; $p=0.90$), hypertension (indigenous peoples 88.9 percent vs. Caucasian 80.3 percent; $p=0.20$), chronic lung disease (indigenous peoples 29.4 percent vs. Caucasian 21.4 percent; $p=0.26$), or illicit drug use (indigenous peoples 5.6 percent vs. Caucasian 2.4 percent; $p=0.22$). The indigenous patients were significantly less likely to use alcohol (indigenous peoples 48.6 percent vs. Caucasian 77.4 percent; $p<0.0001$).

The indigenous peoples and Caucasians were then matched 1:2 using the variables of age, BMI, diabetes, and tobacco use. The prevalence of all risk factors included in the analysis of the propensity-matched groups is shown in Table 1. Within this propensity-matched group, on average, indigenous peoples were younger, with an average age of 60.5 years vs. 63.3 years for Caucasians ($p=0.16$). Sixty-one percent of the indigenous peoples were male as compared to 80 percent of Caucasian patients ($p=0.03$). There was no significant

difference in BMI between the groups (indigenous peoples 31.2 vs. Caucasian 31.6; $p=0.70$). Indigenous patients had significantly higher incidences of renal failure requiring dialysis (16.7 percent vs. 2.9 percent, $p=0.02$). Indigenous peoples had less incidence of alcohol use (48.6 percent vs. 75.4 percent, $p=0.01$). There were no significant differences in rates of dyslipidemia (indigenous peoples 77.1 percent vs. Caucasian 89.9 percent; $p=0.08$), hypertension (indigenous peoples 88.9 percent vs. Caucasian 91.2 percent; $p=0.71$), tobacco use (indigenous peoples 86.1 percent vs. Caucasian 87.1 percent; $p=0.88$), chronic lung disease (indigenous peoples 29.4 percent vs. Caucasian 32.8 percent; $p=0.73$), or illicit drug use (indigenous peoples 5.6 percent vs. Caucasian 4.3 percent; $p=1$) between the two groups.

The majority of patients underwent coronary artery bypass grafting (indigenous peoples 73 percent; Caucasians 79 percent). The other procedures that patients in the dataset underwent included aortic valve replacement (indigenous peoples 15 percent; Caucasians 18 percent) and mitral valve repair or replacement (indigenous peoples 12 percent; Caucasians 3 percent).

Binary logistic regression showed that in propensity-matched groups of indigenous peoples and Caucasians, race did not have a significant effect on whether a patient would have a complication (OR 2.05; 95 percent CI: (0.673, 6.224)) $p=0.21$). Poisson regression analysis also showed that race

Table 1. Prevalence of cardiac risk factors in propensity-matched groups of indigenous and Caucasian patients in South Dakota.

Risk factor	Indigenous peoples (n=36) %	Caucasians (n=71) %
Diabetes	72	71
Dyslipidemia	77	90
Renal failure requiring dialysis*	17	3
Hypertension	89	91
Endocarditis	6	1
Tobacco use	86	87
Chronic lung disease	29	33
Sleep apnea	11	23
Illicit drug use	6	4
Depression	25	19
Alcohol use*	49	75
Immunocompromised status	3	1
Peripheral artery disease	6	15
Cerebrovascular disease	14	9

* Denotes statistical significance.

did not have a significant effect on number of complications within the propensity-matched groups (Odds 1.51, (95 percent CI: (0.7028, 3.2283) $p=0.30$).

Mortality rate was 0 percent for indigenous peoples and 4.3 percent for Caucasians ($p=0.55$). Because indigenous people had a mortality rate of 0 percent, we were unable to run any logistic regression analysis.

Discussion

The patients in the current study had significant differences in cardiac risk factors. The high rate of risk factors such as diabetes and tobacco use among indigenous patients is consistent with previous reports.² The indigenous peoples in this dataset had a significantly lower incidence of alcohol use compared to their Caucasian counterparts, contradicting previous reports.⁵

After controlling for these risk factors however, indigenous patients did not have an increased incidence of complications after surgery. Additionally, there was a 0 percent mortality rate in indigenous peoples after cardiac surgery which is less than the nationally expected mortality rate after cardiac surgery of 2.9 percent.⁶ Previous studies had identified indigenous race itself as a risk factor for mortality but the results of this study contradict that assertion.⁷ As noted by Anderson et al., advances in surgical techniques and care since these previous reports may explain some of the differences noted, as patients with more risk factors may benefit more from these improved techniques.⁸ This same study by Anderson et al. is in agreement with the findings of the current study that indigenous race itself is not a risk factor for mortality.

However, the increased presence of risk factors combined with socioeconomic challenges may negatively impact longer-term survival in indigenous peoples undergoing cardiac surgery. Patients in this study may have traveled quite a distance to have surgery at this center. They most likely receive most of their care on or near reservations through the Indian Health Service (IHS). Patients receiving care through IHS receive lower healthcare expenditures than through other programs and have less access to specialty care.⁹ While indigenous peoples may have similar outcomes to other patients in the short term, the increased prevalence of risk factors combined with healthcare funding concerns and geographic isolation make close follow-up and secondary prevention especially important. One study found that rates of medication adherence and cardiac rehabilitation differed between indigenous peoples and other groups.¹⁰ Programs to improve guideline-directed therapy after cardiac surgery

may help to maintain the positive outcomes seen in the short term.

Limitations

This study has several limitations. It was a single-center, retrospective study with a relatively small number of indigenous patients. The number of postoperative events was also small. As this was a study of indigenous peoples in one region, the results may not be generalizable to other populations.

Conclusion

The indigenous peoples in this study were more likely to be younger and have more cardiovascular risk factors such as diabetes, renal failure, and tobacco use. Following cardiac surgery, indigenous patients had a mortality rate of 0 percent and a complication rate of 22 percent, while Caucasians had a mortality rate of 4 percent and a complication rate of 35 percent. The indigenous peoples had a clinically significant lower complication rate than Caucasians, and race did not play a statistically significant role in contributing to the complication rate. These findings stand in contradiction to other studies that show minority race in itself contributes to increased complications. The increased prevalence of risk factors, however, combined with healthcare funding concerns and geographic isolation make close follow-up and secondary prevention especially important in this population.

Acknowledgments – The authors would like to thank Amy Elliott, PhD, and the Avera Research Institute for their help with this manuscript. We would also like to thank Michelle Pierce at the Avera Heart Hospital for collecting the data.

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Please note: Due to limited space, we are unable to list all references. You may contact South Dakota Medicine at ereiss@sdsma.org for a complete listing.

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Member News

Visit www.sdsma.org for the latest news and information.

Sign up to be Doctor of the Day!

The SDSMA is looking for volunteers for the association's Doctor of the Day Program.

This volunteer commitment involves one day at the State Capitol in Pierre during the state legislative session, by providing basic medical assistance to elected representatives and staff as needed. South Dakota's 2023 legislative session opens Jan. 10.

- Sign up to volunteer at sdsma.org.

Doctors of the Day have the unique opportunity to interact with legislators and get a first-hand look at the legislative process and how it affects the practice of medicine. Your presence at the Capitol shows legislators not only your expertise, but also your concern for the health of South Dakotans.

It is critical that volunteer physicians are serving each day of session. Every year we receive requests from PAs and NPs who wish to participate in the program.

Questions? Contact Justin Ohleen, SDSMA Director of Advocacy and Policy, at 605.336.1965 or johleen@sdsma.org.

Renew your membership for 2023

Thank you for your membership in the SDSMA! If you haven't renewed your SDSMA membership for 2023, please renew soon to keep your membership from expiring (students, residents and honorary life members do not need to act). During the renewal process, you can choose to renew your American Medical Association dues and sponsor a student's SDSMA membership dues for four years of medical school with one, easy transaction.

The SDSMA looks forward to providing you with another year of valuable benefits as the association works to improve health care in South Dakota. Your involvement and advocacy strengthens physician voices, and provides a strong avenue for physicians to be advocates for patients.

Legal Brief Highlight: Reporting Child Abuse

Physicians and other health care professionals are required to report suspected child abuse or neglect and are granted immunity for both making the report and participation in further investigation.

The HIPAA-mandated privacy rules specifically authorize child abuse or neglect reports. If the suspected abuse or neglect is discovered in the physician's clinic, the physician is obligated to immediately make an oral report to the state's attorney, the South Dakota Department of Social Services, or to law enforcement. If the suspected abuse or neglect is discovered in a hospital setting, the physician must report the discovery to the person in charge of the institution or that person's designee. The person in charge must then report the discovery and provide copies of all medical examination, treatment, and hospital records regarding the child. Those who knowingly fail to make the required report and submit the required records are guilty of a Class 1 misdemeanor.

The physician-patient privilege of confidentiality does not exist in any judicial proceeding involving an alleged abuse or neglected child or resulting from the giving or causing the giving of a report concerning abuse or neglect. Any person who makes a report of child abuse is immune from civil or criminal liability. Immunity also extends to the participation in any judicial proceeding resulting from the report of suspected abuse or neglect.

More information is available in the SDSMA legal brief *Reporting Child Abuse* at sdsma.org. The SDSMA provides legal briefs for member physicians on a variety of rules and regulations that apply to the medical profession.

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Member News

Call for Abstracts – USD SSOM Students

The South Dakota State Medical Association announces the Call for Abstracts for presentation at the 2023 Annual Leadership Conference being held at the Hilton Garden Inn Downtown, Sioux Falls on June 2, 2023. The committee welcomes submissions of abstracts from USD SSOM students. Early submission of abstracts is appreciated. The abstract may be from basic science or clinical research.

Submission – Abstracts must be submitted to Keith Hansen, MD, at keith.hansen@usd.edu and Elizabeth Reiss at ereiss@sdsma.org.

Deadline – Wednesday, Feb. 1, 2023

Please prepare your submission in accordance with the following requirements:

- Abstracts must be submitted in a Word document using Times New Roman Font with a font size of 12 and no more than 300 words (not including title and authors' names), single-spaced. Do not indent headings.
- Abstracts should be proofread prior to submission. Abstract data cannot be altered after the submission. Title and authors may not be changed.
- Abstracts must be original work and should not have been previously published.
- The initial aspect of the abstract should contain the title and the author(s) name and respective site(s) of the study.
- The text should be structured to describe the objective of the study and results of your work. It should include the following headings: **Introduction:** a brief statement about the purpose of the study and the current state of research in the field; **Methods:** the method(s) of study or data collection used; **Results:** a summary of the study results including sufficient details to support your conclusions; **Conclusions:** a statement explaining the significance of your work and the implications for further research.
- In the title, please include the type of study: case report, retrospective cohort study, etc.
- Case reports should be structured as **Introduction, Case Report, and Conclusion.**

Notification will occur by March 28, 2023 for abstracts accepted for poster presentation at the SDSMA Annual Leadership Conference. One author must attend the meeting and present their poster. The accepted abstracts will be published in the annual meeting program. The accepted abstracts also will be submitted to a panel of judges for evaluation. One abstract will be selected for an oral presentation of their work at the SDSMA Annual Leadership Conference.

THE LOWDOWN ON TELEHEALTH

Telehealth is here to stay.

NOT JUST A FAD

Payment gateways are the first step in the online payment process, and they have been crucial in helping companies more easily accept online transactions. Healthcare organizations that had never before, or only occasionally, offered virtual care began to see it as a lifeline. It offered both a way to reserve in-person care for the patients that needed it most, as well as a way for others to seek care from the safety of their homes.



PRICING TRANSPARENCY

A demand for greater predictability and transparency around prices and billing is long overdue. America's system of paying for healthcare has long remained complex and opaque. Amidst this complexity, providers and patients bear the burden and risk. Providers want and deserve clarity around payment for health services they have performed.

REAL-TIME PAYMENTS

Technologies that streamline and modernize payment infrastructures have made a major impact within banking and financial services to shore up back-end operations, digitize analog processes and provide better customer experiences. The healthcare industry is primed for this exact transformation, and expects to see an immense shift in how providers get paid.



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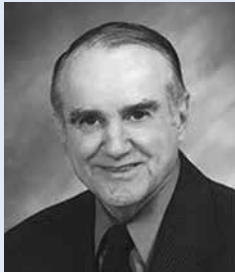
Moving back to only in-person visits might hurt a practice's long-term outlook. Patients across all generations have found that telehealth is very convenient and that they still are very connected to their doctor.

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In Memoriam 2022

Honoring physician members of the SDSMA who passed away in 2022.



Bruce H. Allen, MD



Ray G. Burnett, MD



Fred R. Entwistle, MD



Mike R. Ferrell, MD



Harold E. Fromm, MD
(passed away in Dec. 2021)



George W. Jenter, DO



Carlton J. Kom, MD



Wenzel J. Kovarik, MD



Frank D. Messner, MD



Richard F. Nice, MD



Richard "Rip" I. Porter, MD



Robert "Sarge" C. Preston, MD



Bruce R. Prouse, MD



Julie T. Raymond, MD



John J. Stransky, MD



PATIENT EDUCATION:

Gratitude for Grandparents

Joanie Holm, RN, CNP

A 3-pound baby entered the world in recent days. This precious child was born after his mom spent seven weeks in the hospital on bedrest. At home, Dad and two siblings were working, going to school, and worrying. Surrounding the family were two sets of grandparents who ensured that the pieces all fell into place. From meals and lawn care, to virtual school, from evening shifts and overnights to early mornings, these grandparents were there every step of the way. They will continue to offer support while the baby remains hospitalized and growing, and after he comes home, because that is what grandparents do, if they are able.

Grandparenting can be an awesome stage in life, benefitting the grandchildren, the parents, and of course the grandparents in significant ways. Grandparents are known to influence values and behaviors and provide valuable life experiences. A child who has a connection with grandparents may have increased self-esteem, with better emotional and social skills. A relationship with a grandparent can give a child strength and comfort into adulthood.

In an article titled “Why Grandparents are VIPs,” social researcher, educator and author Susan V. Bosak writes, “The special kind of love you get from a grandparent is a love you can’t get anywhere else. It is an important kind of love – in fact, a very important kind of love. Parents have to worry about who children will become in the future; their role is to be providers and disciplinarians. Grandparents can just enjoy children for who they are in the moment. The love of a grandparent is often freer, more unconditional, and far less psychologically



Nikoline Arns on Unsplash

complex than a parent’s love. The love of a parent and the love of a grandparent are different, second in emotional importance only to the parent/child relationship.”

In a world of many dual-career families, the benefits of active grandparents can be lifesaving for parents. Often grandparents fill in the gap between school and the time parents get off work, driving kids to different events or helping them with homework.

Lastly, active grandparents report less depression and a higher degree of life satisfaction and a hopeful feeling for the future.

Margaret Mead, a well-known American cultural anthropologist, said the connection between generations was “essential for the mental health and stability of a nation.”

This New Year, may we celebrate the grandparent-grandchild relationship with gratitude.



Joanie S. Holm, RN, CNP, is co-founder and president of Healing Words Foundation that supports Prairie Doc® programming. Follow The Prairie Doc® at www.prairiedoc.org and on Facebook featuring On Call with the Prairie Doc® a medical Q&A show providing health information based on science, built on trust for 21 Seasons, streaming live on Facebook and SDPB most Thursdays at 7 p.m. central.

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