Historical Review of the Vasectomy: Antiquated Beliefs, Novel Techniques, and Contemporary Challenges

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The current debate regarding reproductive rights in the United States has thrust vasectomy into the spotlight for urologists. Although simpler, safer, and more cost-effective than tubal ligation in women, vasectomies are performed half as often as female sterilization procedures in the United States, and there are only 5 countries globally where the prevalence of vasectomy is greater than female sterilization (Bhutan, Canada, Great Britain, the Netherlands, and New Zealand).[1] Moreover, data from the National Survey of Family Growth demonstrate a significant decline in vasectomy utilization rates over the past 2 decades for American males aged 18-45.[2] One potential reason for this low prevalence is negative attitudes surrounding the term sterilization. A recent survey of cisgender, heterosexual men living in the southern United States found that while most participants describe vasectomy as a benign procedure, they associate the term "sterilization" with eugenicist and barbaric historical practices.[3] A separate survey administered by the San Francisco Department of Public Health found that negative associations with the term "sterilization" was a major reason that couples who had reached their desired family size did not choose vasectomy.[4] Although modern vasectomy practices are incongruous with coercive sterilization, affective responses to former associations may hinder the acceptability of the procedure. Thus, an understanding of the history of vasectomy is valuable knowledge for urologists and primary care providers, who are likely to be in regular contact with patients who have completed their childbearing years. This history is also critical for health care providers who counsel and educate their patients on vasectomy as a family planning option. Ultimately, increasing awareness and education about vasectomies will serve to combat existing disparities in the contraceptive burden, which is disproportionately placed on women.

ORIGINS AND MISINTERPRETATION OF THE VASECTOMY

Sir Astley Paston Cooper of Great Britain performed the first recorded vasectomy on a dog in 1823.[5] A devoted comparative anatomist and surgeon, Sir Cooper identified several previously undescribed structures, such as the cremasteric fascia of the scrotum and the suspensory ligaments of the breasts. In an address to the Royal College of Surgeons, he demonstrated that ligation of the vas deferens in dogs does not lead to atrophy of the testis, which opened the door for this procedure to be performed in humans.[6] However, vasectomy was not initially performed in humans as a method of birth control. Instead, Reginald Harrison, a urogenital specialist in the Royal College of Surgeons who performed the first human vasectomy, believed that the procedure could be used as an alternative to castration for the treatment of benign prostatic hypertrophy.[5] In 1880, after publishing his seminal work, *Disorders of the Urinary Organs*, he became a prominent figure and leading authority on urologic pathology. Harrison went on to perform more than 100 vasectomies between 1893 and 1900.[7] However, studies on early vasectomy patients by Felix Guyon, a French urologist more famously known for the eponymous ulnar canal of the wrist, found that vasectomy was useless as a means of inducing prostatic atrophy for benign prostatic hypertrophy.[7]

Unfortunately, the turn of the 20th century and the rise of the eugenics movement led to the cooptation of vasectomy as a technique for sterilizing men considered unfit to reproduce. After performing the first vasectomy in the United States in 1897, Dr Albert Ochsner published a paper titled, *Surgical Treatment of Habitual Criminals*, where he praised the vasectomy as a procedure for preventing the procreation of "inebriates, imbeciles, perverts, morons, epileptics, criminals, and degenerates."[8] Dr Harry Sharp, who lobbied to successfully pass the world's first compulsory sterilization law in Indiana in

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1907, performed hundreds of forced vasectomies on prisoners at Indiana Reformatory between 1899 and 1919 in a misguided attempt to cure sexual deviancy and promote eugenics.[9] Additionally, state-supported sterilization programs began performing involuntary vasectomies on "defective" persons. These programs, which targeted Black ethnic minorities under the premise of reducing society's "racial degeneration," sterilized an estimated 6000 Americans and persisted until the 1950s, at which point condemnation by the Catholic Church and staunch opposition from national medical organizations brought the movement to an end.[10]

During the same period, the Austrian experimental physiologist Eugen Steinach began touting the health benefits of a unilateral vasectomy. Steinach, who also performed testicular transplants, believed that "a man is as old as his endocrine glands." Therefore, severing one of the vasa deferentia could cure the ailments of aging, restore general vigor, and rejuvenate sexual potency by boosting the hormonal output of the vasectomized testicle.[11] The so-called "Steinach vasoligature" became widely popular in the 1920s; it was performed across the world until it was debunked when testosterone was isolated for the first time in 1935.[7,11] Sigmund Freud, who knew Steinach through his research on the treatment of homosexuality, famously underwent the procedure in 1923, hoping that it would be effective in treating his maxillary oral squamous cell carcinoma, as cancer was considered a disease of old age at the time.[12]

VASECTOMY AS A CONTRACEPTIVE METHOD

With the demise of the eugenics movement in the 1940s following World War II, vasectomy finally came to be regarded as a technique for elective contraception.[5] In 1945, Charles S. Cameron, a surgeon in the United States Naval Reserve, demonstrated successful re-anastomosis of the vas deferens and restoration of fertility in men returning from war who were previously vasectomized.[13] Further studies in the 1950s surveying voluntarily vasectomized men showed that men lost an average of less than one day of work and reported no decrease in sexual satisfaction—94% said they would undergo vasectomy again.[14] Such research demonstrating safety, efficacy, and the possibility of reversal empowered physicians to view vasectomy as an acceptable contraceptive option and a valuable tool for family planning. Indeed, many physicians came to view vasectomy as preferable to female sterilization, as it presented less risk with a shorter recovery time.[1] In 1954, the first national-scale vasectomy program was launched in India to assist with voluntary family planning.[7] Vasectomy became an admired contraceptive method in India because it was culturally sensitive.[15] Many Indian women did not want to be counseled about birth control or operated on by male doctors, yet female physicians were scarce. Thus, vasectomy provided a reliable method for family planning that respected Indian sociocultural preferences. In 1971, the Ernakulam District of Kerala, India, organized a family planning festival that offered monetary incentives to men who underwent vasectomy, resulting in 63,000 men being vasectomized.[7] One year later, the Indian state of Gujarat carried out 222,000 procedures at massive vasectomy camps, awarding these men with gold medals, merit certificates, and letters of appreciation from officials.[7]

In 1960, the first oral contraceptive pill for women, mestranol/noretynodrel, became available in the United States, revolutionizing the clinical management of contraception. Procedural intervention was no longer required to prevent pregnancy, and reversal was achieved by simply stopping the medication. However, many unintended pregnancies still occurred in women taking oral contraceptive pills, whereas vasectomy had a failure rate of less than 1% after confirmation of azoospermia by post-vasectomy semen analysis.[16] Furthermore, the no-scalpel vasectomy (NSV), developed in China in 1974, could be completed in 10 minutes with local anesthesia; the NSV uses forceps to make a small puncture in the scrotum instead of incising the skin with a knife, thus reducing pain and bleeding. The first NSV was performed in the United States by Dr Marc Goldstein in 1985.[17] Now the technique of choice in North America, the NSV has been routinely performed as an outpatient procedure on over 15 million men since its development.[17]

VASECTOMY IN THE 21ST CENTURY

Vasectomy continues to be the only long-acting reversible contraception available for men today. Estimates now place the vasectomy rate at 500,000-750,000 per year in the United States alone.[7] Although the Affordable Care Act (ACA) does not cover vasectomies because they are not considered a preventative service, 8 states currently require state-funded health insurance plans to cover the cost (Illinois, Maryland, New Jersey, New Mexico, New York, Oregon, Vermont, and Washington) (Fig. 1).[18] In contrast, the ACA guarantees federal coverage of tubal ligation.[18] After the Supreme Court's *Dobbs v. Jackson* decision in June 2022, which effectively overturned the right to termination of pregnancy outlined in *Roe v. Wade*, a wave of advocacy efforts ensued to safeguard reproductive health for women and close the sterilization gap between the sexes. Notably, the number of vasectomy consultations and procedures has increased significantly since this decision.[19] Nevertheless, redistributing the contraceptive burden from women to men is not without challenges. The National Health Law Program is one of many organizations working to introduce contraceptive equity legislation that expands insurance coverage to include vasectomies[20]—the American Urological Association may want to consider advocacy efforts that support insurance coverage for vasectomies as well.

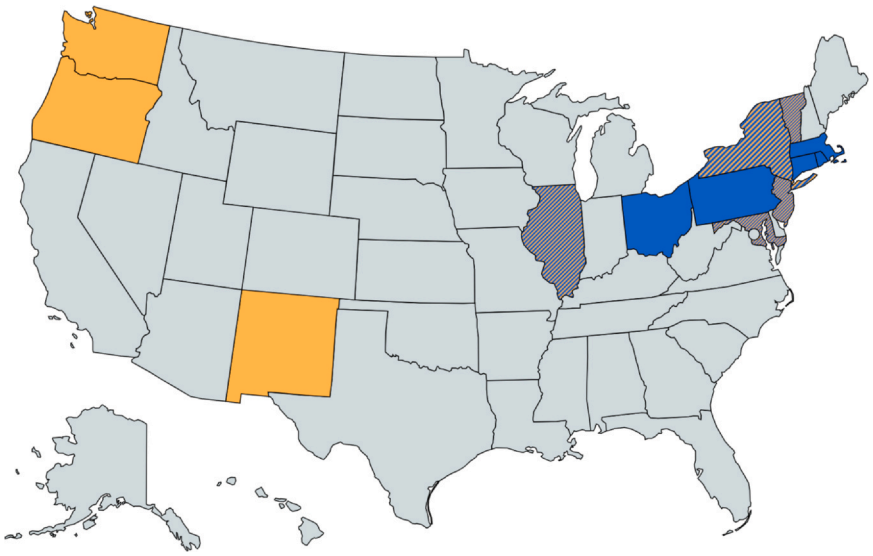

Figure 1. States with insurance plans that are required to cover the cost of vasectomy and states with the 10 highest urologist-to-population ratios. Orange = States with insurance plans that cover the cost of vasectomy. Blue = States with the 10 highest urologist-to-population ratios. Striped orange and blue = Both. (Color version available online.)

Lack of widespread coverage for vasectomy prevents males of lower socioeconomic status from equitable access to the procedure. The National Survey of Family Growth consistently reports that men with private insurance and higher household incomes are more likely to utilize vasectomy.[2,4] Furthermore, an analysis of the costs and the net health effects of 13 different contraceptive methods found that the cost of a vasectomy is $902 while the cost of tubal ligation is $4931.[21] Follow-up over a 2-year period showed that vasectomy resulted in $4029 greater cost savings than tubal ligation, making vasectomy the most cost-effective contraceptive method from a pre-insurance standpoint.[21]

Irrespective of its cost-effectiveness, safety, and availability, vasectomy remains an under-utilized method for family planning. One reason that vasectomy is significantly less prevalent than tubal ligation is related to public misconceptions about the procedure. In a survey of 564 American men ages 25-55, only 50% of men correctly answered that a vasectomy does not reduce a man's desire for sex, only 48% of men correctly answered that a vasectomy does not affect the ability to maintain an erection, and only 43% of men correctly answered that a vasectomy does not impact the ability to have an orgasm.[22] Hispanic men and men living on incomes below 200% of the federal poverty level were less likely to have high vasectomy knowledge compared to White, non-Hispanic, and higher-income survey respondents.[22] Although false, the belief that vasectomy might affect sexual function stigmatizes the procedure. Furthermore, recent meta-analyses claim an association between vasectomy and prostate cancer.[23] While the correlation was close to null when examining only high-quality studies, the possibility of increased cancer risk creates additional anxiety and hesitation for patients. There is no known biological mechanism that explains this association; one rationale is that vasectomized men are more likely to utilize preventative care services, and therefore more likely to be screened and to receive a diagnosis of prostate cancer.

Another factor that likely contributes to the under-utilization of vasectomy is the relative scarcity of urologists in non-metropolitan areas. In fact, national data from the United States Department of Health and Human Services Area Resource File reveal that 63% of the counties in the United States lack a urologist and only 2% of rural counties have any urologists.[24] Counties with a larger insured population, a higher median income, a higher employment rate, and a higher education level are more likely to have a urologist.[24] Moreover, of the 63% of the counties with zero urologists, 76% are in states with restrictive abortion laws, and counties with the most restrictive laws have a stronger negative association with provider density, especially female providers.[25] Compounded with the lack of federal insurance coverage for vasectomy, the geographic clustering of urologists in high-income, more liberal, urban environments creates an uneven distribution of providers that limits access to vasectomy services for men of lower socioeconomic status.

CONCLUSION

Ultimately, vasectomy is a safe and cost-effective option that can help promote equitable contraceptive responsibility in the United States, and it remains the gold-standard procedure for heterosexually-active men who wish to prevent pregnancy. Yet the muddy history of vasectomy combined with limitations in access to care have severely reduced its implementation and widespread use today. It is

important for family planning providers to identify patient concerns and address misconceptions regarding vasectomy in order to counsel patients appropriately about their contraceptive options.

Declaration of Competing Interest

The authors declare no conflict of interest.

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