

Teaching radical prostatectomy in sub-Saharan Africa

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In the United States alone, approximately 220000 new cases of prostate cancer will be detected in 2007, and 27000 men will die of that disease. African American men will suffer disproportionately, having a prostate cancer incidence that is nearly 60% higher than their Caucasian counterparts. In fact, it is widely accepted that African American men have the highest incidence of prostate cancer in the world. This observation has led investigators to study the prostate cancer risk among African men in an effort to identify factors responsible for the high incidence of prostate cancer that plagues the African American population. Findings suggest that the public health burden of prostate cancer to native African men is substantial.

Effective management of prostate cancer depends on early detection of the disease and its definitive treatment. Cost-effective management can be elusive. Radical prostatectomy

can cure clinically localized disease and may offer long-term cancer control in patients with stage T3 disease. Of the various forms of radical prostatectomy, radical perineal prostatectomy is ideally suited to accomplish these goals in sub-Saharan Africa.

A program to teach radical perineal prostatectomy has begun in Dakar, Senegal. It is a system based on graded surgical responsibility. High-quality audiovisual guides familiarize surgeons with the procedure's unique anatomic concerns. They then observe live procedures, assist in live procedures and eventually begin performing the live procedures under direct supervision. Repeated performance of the operation with simultaneous critique is the hallmark of this program, the goal of which is to establish a center of excellence where surgeons throughout the continent can come to learn this technique.

Key Words: prostate cancer, radical perineal prostatectomy, sub-Saharan Africa, prostate specific antigen

Introduction

In the United States alone, approximately 220000 new cases of prostate cancer will be detected in 2007, and over 27000 men will die of the disease.¹ African American men will suffer disproportionately, having a prostate cancer incidence that is nearly 60% higher

than their Caucasian counterparts.² In fact, it is widely accepted that African American men have the highest incidence of prostate cancer in the world. Several other populations of African descent, particularly in the Caribbean, are afflicted by unusually high incidences of the disease as well.³ These observations have led investigators to study the prostate cancer risk among African men in an effort to identify factors responsible for the high incidence of prostate cancer that plagues the African American population. Findings suggest that the public health burden of prostate cancer to native African men is substantial.⁴

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Effective management of prostate cancer depends on early detection of the disease and its definitive treatment. Cost-effective management can be much more elusive. Radical prostatectomy can cure clinically localized disease and may offer long-term cancer control in patients with stage T3 disease.^{5,6} Of the various forms of radical prostatectomy, radical perineal prostatectomy is ideally suited to accomplish these goals in sub-Saharan Africa. It can be performed under general or regional anesthesia. Blood transfusion is not generally needed. It does not require the costly technology associated with laparoscopic or robot-assisted prostatectomy. It is comparable to other forms of radical prostatectomy in terms of positive margin rates, nerve-sparing capability and in the incidence of postoperative stress urinary incontinence.

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Cancer risk and obstacles to diagnosis and treatment

Several authors have identified and documented the African American male's increased risk of developing adenocarcinoma of the prostate when compared to men of other races. Like men with a family history of prostate cancer, being of the African American race mandates tight surveillance and screening for prostate cancer since these men are at risk to develop prostate cancer at a relatively early age.^{7,8} Additionally, they are more likely than men of other races to be diagnosed with high-grade disease, and according to some reports, advanced stage disease.⁹

Socioeconomic and cultural factors have been implicated in the race disparity, particularly with regard to prostate cancer stage at the time of presentation.¹⁰ Access to quality healthcare in the United States often hinges upon financial well being. Poverty creates a major obstacle toward receiving care even for acute medical problems. Health maintenance and screening can be seen as an unaffordable luxury by the impoverished or uninsured. As a result, scheduled digital rectal exams and prostate specific antigen (PSA) blood testing are

neglected. The cost of travel to the nearest medical professional can prove prohibitive. Among the poorer communities, public awareness campaigns are either non-existent or fall far short of their aim. Faced with potential treatment-related erectile dysfunction and stress urinary incontinence, many with access to care choose not to be evaluated.

The same barriers that prevent adequate prostate cancer screening, early detection and definitive treatment for the African American male also plague the native sub-Saharan male. Further complicating the effective management of prostate cancer in sub-Saharan Africa is the general unavailability of radiation therapy, leaving radical prostatectomy the sole curative therapeutic option. It is therefore critical that a center of excellence be established in sub-Saharan Africa to perform and teach affordable, minimally invasive, nerve sparing radical prostatectomy.

Radical perineal prostatectomy

Radical perineal prostatectomy was made popular in the United States in the early 1900's. Hugh Hampton Young, working at Johns Hopkins Hospital in Baltimore, Maryland used the perineal route, first described by Buchler, for surgical extirpation of the prostate. The procedure remained in favor until the 1970's.¹¹ When the importance of lymphadenectomy as a critical staging tool was recognized, surgeons began approaching the prostate through the retropubic approach, which allowed simultaneous access to the pelvic lymph nodes. The anatomic localization of the neurovascular bundles by Patrick Walsh increased the appeal of the retropubic prostatectomy. Radical perineal prostatectomy remained in decline until the 1990's, when a resurgent interest in the procedure was born out of the advent of PSA and algorithms that could predict the likelihood of lymphatic metastases based on blood levels of the serine protease and the Gleason grade determined by prostate biopsy.¹² The push toward minimally invasive procedures also helped enhance the popularity of radical perineal prostatectomy, yet even today fewer than 5% of urologic oncologists perform radical prostatectomy using this approach.

Radical perineal prostatectomy is performed through a curvilinear incision placed between the two ischial tuberosities, approximately 2 cm from the anus. Once the central tendon of the perineum and the rectourethralis muscles are incised, the prostate becomes palpable, lying just beyond Denonvillier's fascia. A vertical midline incision into Denonvillier's fascia allows mobilization and preservation of the

neurovascular bundles and identification of the membranous urethra at the apex of the prostate. The dorsal venous complex is avoided during removal of the gland, limiting blood loss. The vesicourethral anastomosis is performed in a widely open, shallow surgical field with excellent visualization of the bladder neck and membranous urethra, making anastomotic suture placement simple. An indwelling Foley catheter remains 10 to 14 days postoperatively. Short-term and long-term complications of radical perineal prostatectomy and the incidence of positive surgical margins parallel those of radical retropubic prostatectomy,^{13,14} however, postoperative pain and the need for blood transfusion are less with radical perineal prostatectomy.

Radical perineal prostatectomy is well suited to sub-Saharan Africa where financial limitations, access to an untainted blood supply and a cultural aversion to the potential postoperative sexual dysfunction and urinary incontinence can be significant concerns.

All the instruments used in performing a radical perineal prostatectomy are durable and reusable, therefore the average cost per case is quite low. The only case by case expenditures are the Foley catheter, a Penrose drain, sutures, hemostatic clips (optional), sponges (compresses), and dressings. The average cost of these items is \$260 (US) per case, including the hemostatic clips. In Senegal, as opposed to in the United States, surgical drapes, electrocautery equipment and suction devices are reusable and further curtail costs.

The average blood loss during radical perineal prostatectomy at our institution is 314 ml. Blood transfusion is required in less than 8% of cases. Where autologous blood donation programs are not available or where a reliable source of untainted blood cannot be guaranteed, radical perineal prostatectomy can provide results equivalent to laparoscopic or robot-assisted prostatectomy in terms of this outcome parameter.

Unlike laparoscopic or robot-assisted prostatectomy, radical perineal prostatectomy can be performed under either general or regional anesthesia. Anesthetic costs associated with the procedure can therefore be more tightly controlled. Also limiting anesthesia costs, regardless of the route of the anesthetic chosen, is the relatively short operative time. At Doylestown Hospital the average radical perineal prostatectomy is accomplished within 82 minutes.

The incidence of post-prostatectomy urinary incontinence is approximately 3% one year after surgery at our institution. The severity of the urinary incontinence is generally mild and manageable with a light pad. The incidence of postoperative erectile

dysfunction is dependent upon a number of preoperative and intraoperative factors, including patient age, preoperative erectile function and the ability to perform a bilateral nerve sparing prostatectomy. In healthy males under age 60 years who are fully potent and receive a bilateral nerve-sparing procedure, nearly 40% will remain impotent 2 years postoperatively. Sixty percent of our patients will be potent at that same end point, some relying on PDE5-inhibitors. Proper preoperative counseling and education will likely determine whether the average sub-Saharan male finds the risk of post-prostatectomy incontinence and erectile dysfunction acceptable.

Training program

In June 2004 the first radical perineal prostatectomies were performed at Hôpital Général de Grand-Yoff in Dakar, Senegal as part of a nascent training program. Present were Dakar University staff physicians and residents along with a number of visiting professors from Dakar and neighboring West African nations. The surgeries were preceded by an audiovisual presentation to familiarize participants with the procedure they were to observe. Visiting professors and residents participated in the procedures as first assistants. Live recordings of the operations were made and a video teaching library was begun. Between the summer of 2004 and the spring of 2007 urologists from Dakar University and Doylestown Hospital in Doylestown, Pennsylvania visited one another's institutions to advance the teaching process. A second formal training program was held in Dakar in April 2007. Participants took a more active role in the surgeries performed at this time. Once again, didactic sessions were scheduled as part of the program and included presentations in anatomy and pathology.

The hallmark of the Dakar surgical training program is active participation with direct supervision. It is styled after typical Western surgical residency programs characterized by graded surgical responsibility.¹⁵ To best prepare West African surgeons to perform radical perineal prostatectomy on their fellow countrymen it is critical that they be trained in their own facilities. A strength of this program is that it has been established in West Africa. Using equipment and technologies already available in the region, radical perineal prostatectomy has been successfully performed and taught. The goal of this program is to establish a center of excellence where surgeons from throughout the African continent can travel to learn this form of radical prostatectomy. To realize this goal, future training programs will be scheduled in Dakar, surgeons in training will review instructional videotape recordings

between scheduled live demonstrations and a select few will be chosen for most intense training. Hopefully, with adequate financial support, a surgeon-in-residence program can be developed to provide continuous instruction for periods of months at a time. □

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