

ORIGINAL RESEARCH—SURGERY

A Guide for Inflatable Penile Prosthesis Reservoir Placement: Pertinent Anatomical Measurements of the Retropubic Space

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ABSTRACT

Introduction. The primary concern for many prosthetic urologic surgeons in placing the three-piece inflatable penile prosthesis (IPP) is the concept of “blind reservoir placement.” Extensive reports permeate the literature regarding bladder, bowel, vascular, and various hernial complications occurring while attempting to place the reservoir into the retropubic space. However, despite these widely documented complications, there is a paucity of published literature on surgically pertinent anatomical measurements of the retropubic space relating to reservoir placement. The focus of this project was to evaluate the special relationships and anatomical measurements of the retropubic space to better aid the surgeon in the safe placement of the reservoir.

Aim. Analyses of the spatial measurements of reservoir placement into the retropubic space with a focus on utilizing a penoscrotal approach were conducted. In addition, we reviewed and evaluated the published literature for important contributions surrounding the various surgical techniques during placement of a penile prosthesis reservoir.

Methods. Cadaveric pelvic specimens were dissected to determine the distance and angulation (in degrees) from the inguinal ring to several critical anatomic structures in the pelvis. This format was utilized to simulate the basic features of reservoir placement into the classic retropubic space. We also reviewed and evaluated the published literature for important contributions describing the various surgical techniques in the placement of penile prosthesis reservoirs into the retropubic space.

Main Outcome Measures. Anatomic measurements were obtained from the inguinal ring to the bladder, external iliac vein, and superior origin of the dorsal suspensory ligament at the anterior apex of the pendulous penis. The angle was measured from the inguinal ring to these structures and recorded. We also reviewed the published literature for various penoscrotal IPP surgical techniques involving placement of the reservoir into the retropubic space to further supplement the pertinent spatial relationships data acquired in this study.

Results. Of the 28 cadavers, 3 were excluded because of signs of major pelvic surgery, and an additional 6 sides were excluded because of unilateral fibrosis/surgery or difficulty in exposure. Distance to the decompressed bladder was 5–8 cm (average 6.45 cm) at a 15–30 (22.8) degrees medial measurement from the inguinal ring. The filled bladder was 2–4 cm (average 2.61 cm) from the inguinal ring. The external iliac vein distance from the inguinal ring was 2.5–4 cm (average 3.23 cm) at a 20–60 (36.4) degrees lateral measurement from the inguinal ring. Heretofore, the published literature does not appear to have detailed measurements that are provided in this study.

Conclusions. These anatomical measurements of the retropubic space demonstrate the importance of decompressing the bladder and avoiding deep dissection lateral to the inguinal ring, as the external iliac vein is much closer than currently espoused. We feel that these data are significant to the surgeon proceeding with reservoir placement during

IPP surgery. Henry G, Hsaio W, Karpman E, Bella AT, Carrion R, Jones L, Christine B, Eisenhart E, Cleves MA, and Kramer A. A guide for inflatable penile prosthesis reservoir placement: Pertinent anatomical measurements of the retropubic space. *J Sex Med* 2014;11:273–278.

Key Words. Penile Prosthesis; Penis; Surgery; Anatomy

Introduction

Blind reservoir placement is widely considered the bane of the penoscrotal approach to inflatable penile prostheses (IPPs). Extensive reports in the literature abound describing bladder, bowel, vascular, and different types of hernia complications occurring while attempting to place the reservoir into the retropubic space [1–9]. However, despite these widely documented complications, there appears to be no published literature on the important anatomical measurements of the retropubic space relating to reservoir placement. In fact, many urologists compromise the implant models they offer patients because of their inability to perform this step of the procedure. Furthermore, the existing published literature on surgical placement of the reservoir into the retropubic space does not offer a careful, clearly descriptive, step-by-step guide for inexperienced prosthetic urologists [10–12]. Nor does the existing literature provide detailed measurements that may assist the placement of the reservoir into the retropubic space. We evaluated the pertinent anatomical measurements of the retropubic space to better aid in the safe placement of the reservoir.

Methods

A group of high volume prosthetic surgeons with extensive publication histories on reservoir placement and related complications critically appraised these data. Specifically, this group focused on pertinent anatomical measurements of the retropubic space to assist in placement of the reservoir during implantation of three-piece IPP with special emphasis on surgical safety. A review of the published literature using PubMed line searches was conducted (search terms used “penile prosthesis reservoir complications,” “penile prosthesis reservoir complication,” and “penile prosthesis complication hernia” searched on July 29, 2013) with emphasis on complications involved with placement of the reservoir into the retropubic space.

A total of 22 cadaver bodies in 5 different surgical training courses and at 2 locations were used

for a total of 44 possible sides. Cadaveric dissection was performed, and measurements were done by a group of six experienced prosthetic urologists. In addition, an independent, seventh prosthetic urologist at a large university anatomy lab evaluated 6 bodies for possible 12 sides. A total of 56 sides were evaluated. Exclusion criteria included any signs of surgery/fibrosis in the pertinent anatomic areas or difficulty in exposure.

All measurements were taken from the ipsilateral inguinal ring at the point nearest to the pubic bone and to the nearest point of the decompressed bladder, with the bladder filled to 200 mL. In addition, measurements to the nearest point of the external iliac vein and to the superior anterior insertion point of the apex of the penile dorsal suspensory ligament were performed (Figure 1). The angulation medially (for the bladder) and laterally (for the vein) was determined using the ipsilateral inguinal ring. The pubic tubercle was the baseline for this measurement, and the superior ridge of the pubic bone for the zero degree axis tilt was taken using a handheld protractor. If unable to catheterize the cadaver, intra-pelvic measurements were not taken. In addition, the pelvis was tilted in a Trendelenburg position for the measurements (the authors advise positioning the patient in Trendelenburg position for placement of the reservoir in the retropubic space). The insertion point of the superior anterior insertion point of the penile dorsal suspensory ligament at the point of the ring nearest to the pubic bone (using both inguinal rings) was then determined, both in terms of measurement and angulation.

Statistical Analysis

Distance measurements were summarized by their means, standard deviations, medians, and ranges. The intra-class correlation coefficient and corresponding asymptotic 95% confidence interval were used to evaluate intrarater reliability [13]. The nonparametric two-sample Wilcoxon rank-sum (Mann–Whitney *U*) test was used to compare distances measured on cadavers from two different sources [14].

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