

Research Article

Penile Prosthesis Implantation and Infection: Experience with the “No Touch” Surgical Technique

Johann Barkatz^{1,3*}, Sebastien Beley^{2,3}, Hugues Bittard¹, François Kleinclauss¹, Olivier Cussenot³

¹Department of Urology, Regional University Hospital of Besançon, Besançon, France

²Urology Center Paris Opera, Paris, France

³Department of Urology, Tenon Hospital, HUEP, AP-HP, Sorbonne University, Paris, France

***Corresponding author:** Johann Barkatz, Department of Urology and Renal Transplantation, CHRU Besançon, 3 boulevard A.Fleming, 25030 Besançon, France. Tel : +33-381219170 ; Fax : +33-381218893 ; Email: johann.barkatz@chu-besancon.fr

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Abstract

Aim: The objective is to report our experience with use of the “No Touch” method to reduce penile implant infections.

Materials: We carried out a retrospective, single-centre study, from January 2011 to December 2015 in 94 patients having undergone implantation of a total of 102 penile prostheses using the “No Touch” surgical technique. This procedure uses an additional non-adhesive, transparent surgical drape to avoid any contact between the penile implant and the patient’s skin. The patients included presented severe erectile dysfunction. We recorded: the characteristics and causes of the patients’ erectile dysfunction, along with perioperative events: implant infections or revision surgery.

Results: The mean age was 61.8 years (standard deviation \pm 9.37) (extremes 29.1-81.8 years). Comorbidities included 57% patients with hypertension, 47% with dyslipidaemia, 33% with type-2 diabetes and 18% with treated ischaemic heart disease. 46% of patients were overweight, 20% were obese and 35% were smokers. Finally, 35% of patients had been treated for prostatic adenocarcinoma, either surgically or by radiotherapy. Postoperatively, there was a 2% infection rate following the first implantations and a total infection rate of 4% for all procedures (first implantation and repeated implantation).

Conclusion: In a population with risk factors for infection, the principles of the “No Touch” surgical technique are an effective additional therapeutic option to reduce penile prosthesis infections.

Introduction

Erectile dysfunction is a multifactorial condition and it is estimated that 31.6% of men over the age of forty in France present moderate erectile dysfunction (according to IIEF-5 score) [1]. With patient demand for management of their erectile dysfunction growing and effective treatments becoming increasingly available in today’s society, in which there is greater recognition of the sexuality of older couples, it is becoming essential to offer therapeutic options. Surgical treatment of erectile dysfunction via the implantation of a penile prosthesis is recommended for patients in whom first and second-line medical treatments have failed and/or those who are seeking a permanent solution to their problem [2]. Penile implants provide well-prepared couples with greater sexual satisfaction than first-line treatments, with a satisfaction

rate of around 91% [3,4]. The most feared complication of this surgery is penile implant infection. When implant infection occurs, this usually requires hospitalization of the patient, with further emergency surgery. Therefore, the question is raised of how to reduce the risk of penile implant infection. An enhancement of the surgical technique has been proposed in order to optimize the reduction of the implant infection risk [5]. The “No Touch” surgical technique concept is based on the fact that it is usually germs present on the patient’s skin that are implicated in penile implant infections [6]. The skin acts as a bacterial reservoir in this case. The aim of the “No Touch” technique is to avoid contact between the implant, the patient’s skin, the surgical instruments and the surgeon’s gloves. Our objective is to report our experience with use of the “No Touch” method in terms of its impact on the reduction of penile implant infections.

Methods

This is a retrospective single-center study from January 2011 to December 2015. The patients included presenting severe erectile dysfunction, resistant to first and second-line treatments or refusing these treatments for cost-related reasons or problems related to the acceptability of oral or local treatments. The patients all underwent an interview and a standardized physical examination before surgery. The data studied were derived from the patients' medical files and the following were collected for each: demographic characteristics, comorbidities and causes of their erectile dysfunction. The patients were all given a cooling-off period in which to consider their decision of at least one month prior to surgery. Each procedure was performed using the “No Touch” technique initially described by Dr J.F Eid [5], developed to reduce the risk of penile implant infection. The procedure begins with a penoscrotal incision and dissection of the superficial fascia before insertion of a Scott retractor. This is then covered with a non-adhesive transparent drape. An opening is made in this drape and disposable hooks are used to simultaneously retract the drape and the edges of the skin incision. The skin, which is the main reservoir of germs, is thus totally excluded from the surgical field. Throughout the procedure, there is no contact between the patient's skin, the surgeon's gloves or the surgical instruments (Figure 1).

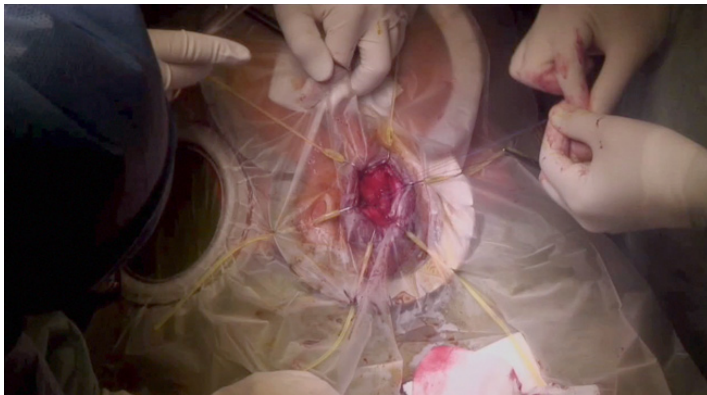


Figure 1: The incision is covered with a non-adhesive transparent drape.

The rest of the procedure follows the same surgical phases conventionally used for penile prosthesis implantation. Each patient was seen again after seven days, six weeks, six months and one year, for an interview and a standardized physical examination, including, in particular, assessment of patient satisfaction, the cosmetic appearance, the scar condition and the good mechanical function of the implant. The data were analyzed retrospectively. The Chi2 test was used to analyze the independence of qualitative factors (XLSTAT 2016, Addinsoft™).

Results

Ninety-four patients were included for the implantation of 102 penile prostheses. The mean age of the patients was 62 years (± 9 years), with extreme ages of 29 and 82 years. Comorbidities included 57% hypertensive patients and 48% with dyslipidaemia. 34% of patients had type-2 diabetes and 18% had treated ischaemic heart disease. 44% of our patients were overweight based on the WHO definition and 24% were obese. Finally, 34% of patients in our study were active or former smokers, with more than 15 pack-years. In terms of urological history, 35% of patients had been treated for prostatic adenocarcinoma, either surgically or by radiotherapy. 21% had a history of penis surgery and 9% of patients had concurrent Peyronie's disease. 4% of patients presented erectile dysfunction secondary to erect penis trauma. Finally, 5% of patients had undergone kidney transplantation and 3% of patients presented severe erectile dysfunction secondary to one or more episodes of priapism. Only one patient had a history of extended rectal surgery to treat adenocarcinoma of the colon (Table 1).

Patients characteristics	n =	Percentage
Patients number	94	-
Prosthesis number	102	
Mean age, years	62 (± 9). (Extreme: 29- 82)	-
Arterial hypertension	58	57%
Dyslipidaemia	49	48%
Overweight (BMI >25)	45	44%
Type-2 diabetes	35	34%
Smokers (more than 15 pack-years)	35	34%
Obeses patients (BMI > 30)	24	24%
Ischaemic heart disease	19	18%

Table 1 : Patients characteristics.

The type of implant (three-piece) used for surgery was more often a Coloplast™ prosthesis (51%) than an A.M.S™ prosthesis. Immediate postoperative complications included one patient who underwent revision surgery for a haematoma, and a 2% infection rate following first implantations. For surgery to change a penile implant, there was an 11% infection rate (p value=0,02; Chi 2 test) i.e. a total infection rate of 4% for all implantation procedures combined (Table 2).

	First implantation	Iterative procedure	Total
Penile prosthesis implantation (n)	84	18	102
Penile prosthesis infection rate (%)	2%	11%	4%
Uretral wound (n)	0	2	2
Local skin problems (palpable tubing, pump malposition)	1	1	4 (4 %)

Table 2 : Complications descriptions.

The bacteria found in penile implant infections - for either first implantations or repeated implantations - included: *Pseudomonas aeruginosa* for one patient, *Escherichia Coli* for another. One of our patients presented a polymicrobial culture: *Enterococcus faecalis* ESBL (extended-spectrum beta-lactamase), *Prevotella biviae*. Finally, no microorganism was detected for the last patient (culture probably eliminated by antibiotic therapy).

During follow-up consultations, the patient satisfaction rates after 3 months and 1 year were 89% and 80% respectively. Over the inclusion period and after one year of follow-up, there were 4 revisions for non-septic problems, i.e. a rate of 4%. These revision surgeries were mainly related to problems of tubing position or pump position.

Discussion

In this series, the risk factors for penile dysfunction are those classically described and found in the literature [2,7,8], although hypertension is the most represented risk factor among our patients. In addition to endothelial and neurotoxic causes of erectile dysfunction, we also find traumatic damage; but treatment of prostatic adenocarcinoma, either surgically or by radiotherapy, is the most frequent cause in our study. However, the therapeutic procedure alone is not responsible for the erectile dysfunction; its combination with medical risk factors also plays a role. The most feared complication of penile implant surgery is implant infection, since this requires emergency surgery and has serious physical and psychological consequences for the patient. In addition, implant infection implies a high cost to health care payers, due to its complex multimodal management. This cost is estimated to be six times higher than the cost of the initial surgery [9,10]. In this series, complying with the principles of the “No Touch” surgical technique, the implant infection rate is 2% in first implantations. In the literature, this rate ranges from 0.1 to 7% in experienced teams following first implantations and from 0 to 33% following repeated prosthesis implantations (revision surgery) [11]. The author of the original surgical technique reports an infection rate of 0.5% [12].

However, it is difficult to compare infection rates between studies due to the significant variability in surgical procedures used, as well as in perioperative antibiotic usages and the characteristics of the populations studied.

The population in this study presents surgical site infection risk factors that may partially explain our infection rate. 66% of our patients have a BMI of over 25 kg/m² and a third of our patients have type-2 diabetes. Although type-2 diabetes has clearly been identified as an implant infection risk factor (particularly in the study by Mulcahy concerning more than 6000 cases) [13], this is still subject to debate [14]. With respect to overweight and obese patients, we cannot reach a conclusion due to the small population size and its frequent association with type-2 diabetes. However, it has now been demonstrated that adipose tissue actively contributes to inflammation and plays a role in immunity via the production of anti-inflammatory factors such as leptin and adiponectin [15]. This has led some authors to suggest that obese people may be more prone to the development of surgical site infections [16,17]. As concerns our bacteriological results on infected implants, we did not find any staphylococcal infection. This confirms that the use of coated implants and the “No Touch” technique helps combat commensal skin bacteria and totally isolate it from the surgical field. Finally, our bacteriological results also show an evolution in the flora responsible for implant infections towards more virulent microorganisms [6,11,18]. The “No Touch” method therefore constitutes one of the options available to combat implant infections. From a medico-economic point of view, the additional cost of the method is very moderate compared to the cost of hospitalization and surgery for implant infection. The “No Touch” method requires the use of a Scott retractor with disposable hooks, as well as a transparent surgical drape. The surgery duration is only slightly longer and does not therefore lead to any additional costs related to operating theatre use. If this small additional cost reduces surgical site infections, this avoids the costs of implant infection to health care payers, represented by hospitalization for several days, prolonged intravenous antibiotic therapy, prolonged local treatments and revision surgery.

Conclusion

Erectile dysfunction is an increasingly frequent reason for urology and andrology consultations. While age is an independent risk factor for erectile dysfunction, the condition is multifactorial and cardiovascular diseases, smoking, metabolic syndrome with their endothelial and neurotoxic disorders are the main causes. When first and second-line treatments are inadequate or abandoned, penile implants are effective for restoring sexual satisfaction within couples seeking this treatment. An improvement in the quality of life of the couple is observed. However, the most serious complication is infection at the surgical site. The principle of the surgical technique for penile prosthesis implantation: “No Touch”

offers the advantage of a low additional cost and avoids any contact between the implant and the patient’s skin, a genuine reservoir of bacteria. Thanks to the extension of this technique - or, in any case, of its principles - aimed at reducing contact between the patient’s skin and the implant, in patients who have been better prepared in the operating theatre, with experienced surgeons using the latest-generation coated implants, the implant infection rate has fallen significantly. This surgical solution has thus become a safe and effective therapeutic option.

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