

The effects of Lichtenstein tension-free mesh hernia repair on testicular arterial perfusion and sexual functions

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Received: 3 November 2012 / Accepted: 1 January 2013 / Published online: 19 January 2013
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Auswirkungen der spannungsfreien Mesh Herniotomie nach Lichtenstein auf die testikuläre arterielle Durchblutung und die Sexualfunktion

Zusammenfassung

Einleitung und Ziel der Studie Die spannungsfreie Mesh Herniotomie nach Lichtenstein stellt den Goldstandard für die Therapie der Leistenhernie dar. Studien haben gezeigt, dass die Komplikationsrate niedrig ist. Da allerdings Strukturen des Samenstrangs durch einen engen Raum durchgehen, wurde die Sorge geäußert, dass die testikuläre Arterie, Vene und das Vas deferens verletzt werden könnten. Ziel dieser Studie war es, die Auswirkungen der Herniotomie nach Lichtenstein auf die arterielle Perfusion der Testes und auf die Sexualfunktion in der frühen postoperativen Phase zu erheben.

Methodik Es wurden 40 männliche Patienten, die sich einer Herniotomie nach Lichtenstein unterzogen, in die Studie aufgenommen. Die Operation erfolgte bei allen unter Spinalanästhesie. Das Vorliegen lokaler Wundkomplikationen wie Serom, Hämatom oder Entzündung wurde am 1. und am 7. postoperativen Tag erhoben. Um die Auswirkung des Operationseffektes auf die Sexualaktivität zu erfassen, wurde Schmerz nach einer 10teiligen visuellen Analog-Skala (VAS) graduiert. Der internationale Index-Fragebogen bezüglich erektiler Dysfunktion (IIEF-5) wurde zur Erfassung einer funktioneller Sexualstörung verwendet. Der arterielle Fluss durch die Arteria testicularis wurde prä- und postoperativ mit Doppler Ultraschall gemessen. Die Patienten

wurden nach die täglichen Aktivitäten limitierenden Schmerzen, nach erektiler Dysfunktion und nach sexueller Zufriedenheit gefragt.

Ergebnisse Die mittlere Operationsdauer betrug 38 ± 5 (23–122) Minuten. Die mittlere Flussgeschwindigkeit in der A. testicularis auf der Operationsseite lag präoperativ bei $5,13 \pm 2,7$ ml/min und postoperativ bei $6,3 \pm 2,3$ ml/min. Dieser Unterschied war statistisch signifikant ($p=0,008$). Die VAS Scores der prä- und postoperativen Periode wurden ebenfalls verglichen und waren statistisch nicht signifikant unterschiedlich ($0,6 \pm 1,4$ vs. $0,8 \pm 1,7$).

Schlussfolgerung Die spannungsfreie Mesh Herniotomie nach Lichtenstein hat weder auf die testikuläre Perfusion noch auf die Sexualfunktion eine negative Auswirkung. Sie kann risikolos zur Therapie der Inguinalhernie durchgeführt werden.

Schlüsselwörter: Spannungs freien Mesh Herniotomie nach Lichtenstein, Visuellen Analog-Skala, Erektile Dysfunktion

Summary

Introduction and aim Lichtenstein tension-free mesh hernia repair has been gold standard for treatment of inguinal hernia. Studies have demonstrated that the complication rate is low. However, because the structures in spermatic cord pass through a narrow space, there has been concern about injury to testicular artery, vein, and vas deferens. The aim of this study was to evaluate the effects of Lichtenstein tension-free mesh hernia repair on testicular arterial perfusion and sexual functions in early phase after the operation.

Methods Forty male patients underwent tension-free mesh hernia repair. All of them underwent Lichtenstein tension-free mesh hernia repair under spinal anesthesia. Patients were evaluated for local wound complications such as seroma, hematoma, and infection on days 1 and 7. To evaluate the effects of surgery on sexual activity, pain was graded on a scale of 1 to 10 by visual analog scale (VAS). International Index of Erectile Dys-

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function (IIEF-5) questionnaire was used in our study to evaluate sexual dysfunction. Testicular arterial flow was reevaluated by Doppler ultrasound. Patients were questioned about erectile dysfunction and sexual satisfaction as well as pain limiting their daily activities and sexual function.

Results Mean operation time was 38 ± 5 (23–122) minutes. Preoperative/postoperative mean flow velocity for operation side (ipsilateral) was 5.13 ± 2.7 ml/min and 6.3 ± 2.3 ml/min respectively and the difference was statistically significant ($p=0.008$). VAS scores in preoperative and postoperative periods were compared and had mean values of 0.6 ± 1.4 and 0.8 ± 1.7 respectively and the difference was not statistically significant.

Conclusion Lichtenstein tension-free mesh hernia repair does not have any negative effects on testicular perfusion and sexual function; it can be performed safely for treatment of inguinal hernia.

Keywords: Lichtenstein tension-free mesh hernia repair, Visual analog scale, Erectile dysfunction

Introduction

Lichtenstein tension-free mesh hernia repair has been gold standard for treatment of inguinal hernia due to low recurrence and high patient comfort[1]. However, it is not certain if neurovascular structures, ductus deferens, and testicular volume are affected negatively as a result of direct mesh contact and perimesh fibrosis[2]. Studies have shown that complication rate is low if appropriate materials are used [1, 3]. However, because the structures in spermatic cord pass through a narrow space, there has been concern about injury to testicular artery, vein, and vas deferens. This prospective trial's aim is to evaluate the effects of Lichtenstein tension-free mesh hernia repair on testicular arterial perfusion and sexual functions in early phase after the operation.

Methods

Forty male patients who underwent tension-free mesh hernia repair in Kecioren Education and Research Hospital between August 2010 and May 2011 were included in the study. Informed consent forms were taken from all of the patients for potential complications. Patients who were female, cirrhotic, heart deficient, diabetic, hypertensive, using anticoagulant medications, having collagen vascular diseases, and patients having age under 16 and over 50 were excluded.

All of the patients underwent Lichtenstein tension-free mesh hernia repair under spinal anesthesia. Following high ligation for indirect hernias and plication of posterior wall for direct hernias, prosthetic mesh was fixed to inguinal ligament with continuous sutures and with single sutures to tendon conjoint and internal oblique muscle using 3-0 Prolene. Hemovac drains were

placed to all patients and when daily drainage was under 30 cc they were removed. Patients were evaluated for local wound complications such as seroma, hematoma, and infection on days 1 and 7.

Doppler arterial blood flow was evaluated using General Electric Logiq 5 Expert (GE Healthcare, Waukesha, WI, USA) 10 MHz linear transducer in supine position. Preoperative, postoperative, ipsilateral, and contralateral flow rates were evaluated and recorded by the same radiologist.

To evaluate the effects of surgery on sexual activity, pain was graded on a scale of 1 to 10 by visual analog scale (VAS). International Index of Erectile Dysfunction (IIEF-5) questionnaire was used in our study to evaluate sexual dysfunction. This questionnaire includes 5 questions to detect erectile dysfunction. These questions are about self confidence regarding continuation of erection, erection stiffness, frequency of maintenance of erection, ability to maintain erection, and sexual pleasure. Every question is evaluated over 5 and totally over 25 points. If total score is below 20 points, it is interpreted as a decline in sexual dysfunction. Five questions about erection and sexual satisfaction were asked in preoperative and postoperative periods and results were compared. Patients were called 3 months later for follow up. Testicular arterial flow was reevaluated by Doppler ultrasound. Patients were questioned about erectile dysfunction and sexual satisfaction as well as pain limiting their daily activities and sexual function.

SPSS 15.0 for windows (Copyright by 2006 SPSS Inc., Chicago, IL) was used for statistical analysis. Preoperative and postoperative VAS, IIEF-5 scores, and testicular arterial flow velocity (ml/min) were analyzed for normal distribution. Testicular arterial flow, visual analog scale, and erectile dysfunction scores were not in normal distribution. Nonparametric Wilcoxon paired test was used for statistical analysis. $P < 0.05$ was accepted statistically significant.

Results

In this study, 40 male patients with a mean age of 45.95 (16–65) were included. Mean operation time was 38 ± 5 (23–122) minutes. Seroma was noticed and aspirated from 2 patients on postoperative day 7. Additionally, there was wound infection to another patient who was treated by second generation cephalosporin and wound care.

Preoperative/postoperative mean flow velocity for operation side (ipsilateral) was 5.13 ± 2.7 ml/min and 6.3 ± 2.3 ml/min respectively and the difference was statistically significant ($p=0.008$). Contralateral preoperative/postoperative mean flow velocity was 5.7 ± 3.7 ml/min and 6.2 ± 2.1 ml/min respectively ($p=0.11$). VAS scores in preoperative and postoperative periods were compared and had mean values of 0.6 ± 1.4 and 0.8 ± 1.7 respectively and the difference was not statistically significant ($p=0.608$). Only one patient had minimal

Table 1. Preoperative and postoperative testicular arterial flow, visual analog scale, and erectile dysfunction scores

| | Mean values | | P value |
|--------------------------------------|--------------|---------------|---------|
| | Preoperative | Postoperative | |
| Ipsilateral flow velocity (ml/min) | 5.13 ± 2.7 | 6.3 ± 2.3 | 0.008 |
| Contralateral flow velocity (ml/min) | 5.7 ± 3.7 | 6.2 ± 2.1 | 0.110 |
| Visual analog scale | 0.6 ± 1.4 | 0.8 ± 1.7 | 0.608 |
| Erectile dysfunction score | 23.9 ± 2.3 | 24.3 ± 1.9 | 0.174 |

erectile dysfunction in preoperative and postoperative periods. Mean preoperative and postoperative IIEF-5 scores were 23.9 ± 2.3 and 24.3 ± 1.9 respectively. The difference between preoperative and postoperative mean values were not statistically significant ($p=0.174$). There was no sexual dysfunction related to operation (Table 1).

Discussion

The aim of this study is to investigate the effects of perimesh fibrosis and edema on testicular arterial flow and sexual function following Lichtenstein tension-free mesh hernia repair. Every year, more than a million mesh implantations are performed for inguinal hernia treatment all over the world [3]. Mesh repair has advantages such as shorter hospitalization, lower recurrence, and postoperative pain. However, there are potential complications of mesh implantation. Most common of these are fistulas, infections, chronic pain, mesh migration, and peritoneal adhesions. Furthermore, fibrosis as a consequence of direct contact between mesh and vessels passing through inguinal channel may lead to ischemic orchitis and testicular atrophy [4–6].

Clinical and experimental studies about mesh repair techniques showed that fibrotic healing of mesh leads to stiffening and shrinking [7]. As a result of foreign body reaction and wound contraction, mesh decreases to 60 %, mesh plug decreases to 10 % of its original size. Lima Neto et al. compared preoperative and postoperative testicular arterial flow and testicular volume and did not find any difference [5]. In contrast to this study, Aydede et al. found difference in early postoperative period but did not find any difference in late postoperative period [8]. El-Awady et al. found beneficial effects of inguinal hernia repair on testicular perfusion [9]. In our study, which was conducted on 40 patients, mean preoperative testicular arterial flow was 5.13 ± 2.7 ml/min and mean postoperative testicular arterial flow was 6.3 ± 2.3 ml/min. The difference was statistically significant ($p=0.008$). We found beneficial effects of Lichtenstein tension-free mesh hernia repair on testicular arterial flow rate.

In this study, testicular arterial flow rate of contralateral side was also evaluated. Contralateral preoperative and postoperative flow rates were 5.7 ± 3.7 ml/min and 6.2 ± 2.1 ml/min respectively. Although the flow

rate increased on the contralateral side, the difference between preoperative and postoperative values was not statistically significant. There has been debate in the literature about timing of evaluating testicular arterial flow following mesh herniorrhaphy. Some studies advocate evaluating in late period as the fibrosis continues for 2 years, but there are other studies which claim that the mechanical pressure and edema may affect low in early postoperative period. Ramadan et al. evaluated testicular arterial flow in postoperative 2 month, Ersin et al. evaluated on postoperative 1 week, Zieren et al. evaluated in postoperative 6 and 12 months [10–12]. We evaluated in postoperative 3 month.

Studies revealed that there was pain in 11 % of patients in early period and 3 % of patients in late postoperative period following prosthetic mesh hernia repair [13]. In Nienhuijs et al. study, 14 % of patients complained about limitation of sexual activity due to pain and loss of sense and 60 % of these recovered spontaneously [14, 15]. In our study, pain was evaluated by VAS and there was pain that limited sexual activity in third postoperative period, but the difference was not statistically significant. Postoperative pain is a clinical problem which causes sexual dysfunction in 22.1 % of patients [13]. Preoperative sexual dysfunction improved in 62.5 % of patients on postoperative 6 month in El-Awady and Elkholy study [9]. Sexual quality of life score improved in 82.5 % of patients on postoperative 3 month and in 95 % on postoperative 9 month [9]. In our study, we used IIEF-5 and there was no sexual dysfunction statistically significant.

In conclusion, Lichtenstein tension-free mesh hernia repair does not have any negative effects on testicular perfusion and sexual function; it can be performed safely for treatment of inguinal hernia.

Conflict of interest

The authors declare that there is no actual or potential conflict of interest in relation to this article.

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