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Original Research Article

Factors that predict testicular atrophy in patients who underwent inguinal hernia repair

Faraj Afandiyev[1], Haydar Celasin[2], Serdar Culcu[3]*

[1]Department of Urology, [2]Department of General Surgery, Faculty of Medicine, Lokman Hekim University, Ankara, Turkey
[3]Department of Surgical Oncology, SBU Dr. Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital, Ankara, Turkey

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***Correspondence:**
Dr. Serdar Culcu,
E-mail: serdarculcu@gmail.com

ABSTRACT

Background: Some of the patients that undergo inguinal hernia repair develop testicular atrophy. Testicular atrophy development also brings about a lot of problems. In our study, we aimed to determine the rate of development of testicular atrophy and predicting factors in patients that undergo inguinal hernia repair in our hospital.
Methods: Patients who underwent inguinal hernia repair in our centre from January 2017 to January 2020 were included in our study. Total number of patients was 158 divided into 2 groups i.e. group-1 (those who developed testicular atrophy after inguinal hernia repair) and group-2 (those who did not develop testicular atrophy after inguinal hernia repair). We investigated the relationship between the development of testicular atrophy and age, hernia type and localization, duration of surgery and anesthesia, perioperative non-steroidal anti-inflammatory drugs (NSAID) and antispasmolytic use, diabetes mellitus and rheumatological disease and, perioperative fluid replacement.
Results: Testicular atrophy developed in 6 of the patients (3.79%). We found that testicular atrophy was mostly secondary and mostly visible in cases underwent open repair (p=0.0001); and in which left and bilateral inguinal hernia repair was performed (p=0.014); and in cases with DM and rheumatological diseases (p=0.0001). We also found that the use of perioperative antispasmolytic and NSAID was lower in patients with testicular atrophy (p=0.0001).
Conclusions: According to the results of our study, advanced age, secondary and open repair, diabetes mellitus, rheumatological disease history, not using antispasmolytic and NSAID increases the risk of testicular atrophy.

Keywords: Testicular atrophy, Totally extraperitoneal procedures, Inguinal hernia, Erectile function

INTRODUCTION

Inguinal hernia is a common surgical pathology. Therefore inguinal hernia repair is a commonly performed surgery.[1-4] Postoperative urinary retention (POIR), postoperative testicular atrophy (POTA), inguinal pain, hypoesthesia may develop following IHO.[5-8] POTA is not a frequent pathology.[7] However, if patients have problems with testicular functions against psychological effects, it can cause erectile dysfunction (ED), loss of libido, and infertility at a young age. Also during surgery, damage to the lymphatic vessels of the spermatic cord may cause hydrocele; damage to the genital branch of the genitofemoral nerve may cause hypoesthesia in the inner surface of the femur and in the outer genitalia.[7-8] POTA may bring about factors such as increased morbidity, in some cases, continuous hormone replacement, increased cost, and longer hospital stay.[9] Investigating risk factors that cause POTA can help reduce the complication rate. Many studies have been conducted investigating the factors predicting POTA development. In the studies conducted, we noticed that hernia type (direct, indirect,

combined, and recurrence), concomitant diseases such as diabetus mellitus (DM), and rheumatoid arthritis were not investigated in the use of perioperative non-steroid anti-inflammatory drugs (NSAID) and antispasmolytic drugs. In our study, we investigated the effects of the factors we pointed out on POTA.

METHODS

Patients over the age of 18 who underwent open and laparoscopic inguinal hernia repair from January 2017 to January 2020 at Lokman Hekim University Akay hospital were included in the study. The patients included in the study was operated by 3 surgeons with more than 20 years of professional experience. Patient data were retrospectively gathered. Total number of patients was 178. Due to the fact that 20 of these patients were women, they were not included in the study. The patients were evaluated with scrotal color Doppler ultrasonography (SRDU) at the preoperative and postoperative 3rd month and also the testis size was compared with the opposite side testis size. Patients having erectile function (EF), were asked whether there has been any loss of libido or not. Hormonal examination was performed only among patients with EF libido loss.

Patients were examined in 2 groups: group-1 (those who developed testicular atrophy after inguinal hernia repair) and group-2 (those who did not develop testicular atrophy after inguinal hernia repair). In our study, we investigated the relationship between the development of testicular atrophy and age, hernia type and localization, duration of surgery and anaesthesia, peroperative NSAID and antispasmolytic use, and having DM and rheumatological diseases in patients undergoing inguinal hernia repair, in the evaluation performed at the postoperative 3rd month. We evaluated the complications developed in the postoperative period according to the Clavien scale.

Surgical technique

Laporoscopic inguinal hernia repair has been carried out open by 3-trocar technique and totally extraperitoneal procedures (TEP) method; inguinal hernia repair has been performed with an inguinal incision. General anesthesia was applied in both techniques. Polypropylene mesh (3.5 5.0 in) was used to cover all inguinal defects and co-adapted to Cooper's ligament and the anterior abdominal wall with spiral titanium tacks in both techniques.

Statistical analysis

Statistical package for the social sciences (SPSS) 23.0 software package was used for statistical analysis of the data. The categorical measurements were summarized in numbers and percentages and continuous measurements were summarized as mean and standard deviation (median and minimum-maximum when necessary). Chi-square test or Fisher test statistic was used to compare categorical variables. Statistical significance level was taken as 0.05 in all tests.

RESULTS

The number of patients included in the study was 158. Number of patients in group-1 was 6, and the number of patients in group-2 was 152. Median age was 64.0±12.3 (47-81) and 48.9±17.4 (18-89) (p=0.037) in group-1 and group-2. Number of patients undergoing preoperative recurrence hernia repair is 23, number of patients undergoing bilateral inguinal hernia is 75, number of patients diagnosed with DM is 40, number of patients undergoing open repair is 36. Antispasmolytic was used in perioperative 15 patients, NSAID was used in 132 patients, and only 2 patients did not use narcotic analgesic. 58 preoperative patients were diagnosed as combined inguinal hernia (direct+indirect inguinal hernia). Mesh graft was applied to all of the patients. Average duration of hospital stay of patients developed testicular atrophy was 1.5 days (minimum 1 day, maximum 2 days). The number of patients who developed testicular atrophy was 6 (3.79%) (Table 1). Only one of the patients who developed testicular atrophy (64 years old) suffered from loss of EF and libido, but the results of hormonal examination were received normal (follicle-stimulating hormone [FSH]: 7.23 mIU/ml; luteinizing hormone [LH]: 5.81 mIU/ml; testosterone: 10.7 nmol/l). Clavien grade-4 and grade-5 complications were not observed in patients. Hydrocele developed in one patient at the postoperative 6th month.

Table 1: Patient demographic data.

Demographic data	N	%
DM		
Exists	40	25.3
None	118	74.7
Surgery		
Laparoscopic	122	77.2
Open repair	36	22.8
Duration of anesthesia (min)		
<60	64	40.5
>60	94	59.5

Continued.

Demographic data	N	%
Operation time (min)		
<60	90	57.0
>60	68	43.0
Perioperative narcotics		
Exists	156	98.7
None	2	1.3
Peroperative antispasmolytic		
None	143	90.5
Exists	15	9.5
Postop replaced fluid amount (cc)		
<1000	68	43.0
>1000	90	57.0
Hernia		
Direct hernia	51	32.3
Indirect hernia	49	31.0
Direct+indirect hernia	58	36.7
Rheumatic disease		
Exists	10	6.3
None	148	93.7
Peroperative NSAID		
Exists	132	83.5
None	26	16.5
Testicular atrophy		
Atrophy exists	6	3.8
No atrophy	152	96.2

Table 2: Univariate analysis results are used to determine independent risk factors causing postop testicular atrophy.

Variables	Group-1 (developing testicular atrophy)		Group-2 (not developing testicular atrophy)		P value
	N	%	N	%	
Age					
<40	0	0.0	61	40.1	0.083
>40	6	100.0	91	59.9	
Case type					
Primary case	0	0.0	135	88.8	0.0001
Secondary case	6	100.0	17	11.2	
The party					
Right side	0	0.0	50	32.9	0.014
Left side	4	66.7	29	19.1	
Bilateral	2	33.3	73	48.0	
DM					
Exists	6	100.0	34	22.4	0.0001
None	0	0.0	118	77.6	
Surgery					
Laparoscop-ic	0	0.0	122	80.3	0.0001
Open repair	6	100.0	30	19.7	
Duration of anesthesia (min)					
<60	1	16.7	63	41.4	0.402
>60	5	83.3	89	58.6	
Operation time (min)					
<60	4	66.7	86	56.6	0.700
>60	2	33.3	66	43.4	

Continued.

Variables	Group-1 (developing testicular atrophy)		Group-2 (not developing testicular atrophy)		P value
	N	%	N	%	
Perioperati-ve narcotics (min)					
Exists	5	83.3	151	99.3	0.075
None	1	16.7	1	0.7	
Peroperati-ve antispasmol-ytic					
None	6	100.0	137	90.1	0.0001
Exists	0	0.0	15	9.9	
Postop replaced fluid amount (cc)					
<1000	2	33.3	66	43.4	0.700
>1000	4	66.7	86	56.6	
Hernia					
Direct hernia	0	0.0	51	33.6	0.219
Indirect hernia	3	50.0	46	30.3	
Direct+indirect hernia	3	50.0	55	36.2	
Rheumatic disease					
Exists	5	83.3	5	3.3	0.0001
None	1	16.7	147	96.7	
Peroperati-ve NSAID					
Exists	0	0.0	132	86.8	0.0001
None	6	100.0	20	13.2	

We statistically evaluated demographic and clinical characteristics of patients with and without postoperative testicular atrophy. Pre- and postoperative testicular volumes of patients with testicular atrophy was determined suitably as 16.53±0.83 cm^3 (9.20-29.1 cm^3) and 15.14±0.89 cm^3 (8.53-26.50 cm^3), pre- and postoperative testicular volumes of patients without testicular atrophy was determined suitably as 16.59±0.87 cm^3 (9.90-23.79 cm^3) and 16:23±0.69 cm^3 (8.63-24.10 cm^3) (p=0.021). As a result patients who developed postoperative testicular atrophy were older than those who did not (p=0.037); testicular atrophy was mostly secondary and open repair (p=0.0001); left and bilateral inguinal hernia repair was performed (p=0.014). We have found that it is seen in patients with DM and rheumatological diseases (p=0.0001). We also found that the use of peroperative antispasmolytic and NSAID was lower in patients with testicular atrophy (p=0.0001) (Table 2).

DISCUSSION

Inguinal hernia repair is a common operation carried out by general surgery doctors. Following surgery, testicular atrophy develops some patients.

This situation brings about a number of health and financial problems. In our study we carried out with 158 patients, POTA development after inguinal hernia repair was 3.79%. In study of Reide et al this rate was reported as 0.5%.[7]

We determined that there was no significant difference between the patients who developed testicular atrophy and those who did not develop atrophy (mean 1.5 days and 1.7 days). When we examined the studies, we saw that these parameters were not taken into consideration.

In the study by Singh et al a significant clinical deterioration in testicular functions was reported in patients underwent open repair using mesh.[9] According to the results of this study, the levels of testosterone decreased significantly and FSH and LH levels increased significantly. In the study conducted by Akbulut et al it was concluded that deterioration in testicular function was higher in patients who underwent laparoscopic TEP by applying mesh, than in patients underwent open repair.[10] In our study, we could not investigate the effect of mesh application on testicular atrophy, since all patients who underwent inguinal hernia repair were subjected to mesh. But, we found that testicular atrophy was higher in patients who underwent open repair (p=0.0001).

According to the results of Wantz and Akbulut wide dissection increases the risk of impairment of testicular nutrition.[10,11] When we examine the surgery reports of the patients we included in our study, we have seen that wide dissection is avoided and inguinal ligament (superior) as a surgical margin for dissection in all patients, pubis (inferomedialde) and aponeurosis (lateral) of the transfers muscle is selected. Therefore, we did not investigate the effect of dissection width on testicular atrophy.

We found that having a history of DM and rheumatological disease and perioperative NSAID and antispasmolytic drug increased the risk of testicular atrophy unlike other studies, in our study.

The limitations of our study are the retrospective nature of the study, the insufficient number of patients and the

distinctness between the groups, the difference in the numbers of patients and the homogeneous distribution of the groups. From this perspective, there is a need for randomized prospective studies.

CONCLUSION

As a result, advanced age, secondary and open repair, diabetes mellitus, rheumatological disease history, not using antispasmolytic and NSAID increases the risk of testicular atrophy. We think that preoperative information and evaluating the opposite testicle in patients with these features will be beneficial.

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