

Inguinal hernia developed after radical retropubic surgery for prostate cancer

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Purpose: In this retrospective study, we aimed to compare the clinical characteristics of inguinal hernia developed after radical retropubic surgery for prostate cancer to the hernia without previous radical prostatectomy.

Methods: Twenty-three patients (group A) who had radical retropubic surgery for prostate cancer underwent laparoscopic or open tension-free inguinal hernia repair from March 2007 to February 2011. Nine hundred and forty patients (group B) without previous radical retropubic surgery received laparoscopic or tension-free open hernia operation.

Results: Group A was older than group B (mean \pm standard deviation, 69.6 ± 7.2 vs. 54.1 ± 16.1 ; $P < 0.001$). Right side (73.9%) and indirect type (91.3%) in group A were more prevalent than in group B (51.5% and 69.4%, respectively) with statistic significance ($P = 0.020$ and $P = 0.023$). The rate of laparoscopic surgery in group B ($n = 862$, 91.7%) was higher than in group A ($n = 14$, 64.3%, $P < 0.001$). In comparing perioperative variables between the two groups, operative time (49.4 ± 23.5 minutes) and hospital stay (1.9 ± 0.7 days) in group A were longer than in group B (38.9 ± 16.9 , 1.1 ± 0.2 ; $P = 0.046$ and $P < 0.001$, respectively) and pain score at 7 days in group A was higher than in group B (3.1 ± 0.7 vs. 2.3 ± 1.0 , $P < 0.001$). Postoperative recurrence rate was not significantly different between the two groups.

Conclusion: Inguinal hernia following radical retropubic surgery for prostate cancer was predominantly right side and indirect type with statistic significance compared to hernias without previous radical prostatectomy.

INTRODUCTION

The number of patients who undergo radical prostatectomy has been increasing significantly due to the increased use of the prostate-specific antigen (PSA) test as an effective screening tool for prostate cancer. Erectile dysfunction, urinary incontinence, and vesico-urethral stricture are relatively well-known complications of radical prostatectomy. However, inguinal hernia also has been reported as a less well-known complication since the mid-1990s [1]. Most studies about postoperative inguinal hernia were conducted by urologists who usually evaluated the incidence and risk factors of the development of inguinal hernia after radical prostatectomy. The incidence of postoperative hernia is as high as 7–21%, and its risk factors, such as a previous history of hernia or abdominal surgery, age, and body mass index (BMI), have been reported, however, the exact mechanism has not been precisely identified [2–6]. Previous abdominal incision, vesico-urethral stricture, and overt clinical

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expression of subclinical inguinal hernia after surgery have been reported as causes of hernia development after radical prostatectomy [2,4,7–9]. Most cases of hernia seem to have developed within 3 years after the surgery.

This study was conducted from the point of view of a general surgeon to compare the clinical characteristics and the surgical results of inguinal hernia that develops after radical retropubic prostatectomy (RRP) for prostate cancer with those of hernia without a history of such a surgery.

METHODS

Between March 2007 to February 2011, a total of 963 patients (age, ≥ 20 years old) underwent inguinal hernia surgery in Hansol Hospital by one surgeon (C.S.C.). Twenty-three patients who had a history of RRP were defined as group A and 940 patients without a history of such a surgery as group B. The age, BMI, location, type of hernia, operative time, pain score, and hospital stay were compared between the groups. Pain score was assessed by using the visual analogue scale (0 to 10) at 7 days after surgery in both groups (group A, $n = 22$; group B, $n = 737$). Recurrence rate after hernia surgery was assessed by telephone interview (group A, $n = 23$; group B, $n = 705$) at the median follow-up of 37 months (range, 6 to 54 months).

A statistical analysis was performed using the IBM SPSS ver. 18.0 (IBM Co., Armonk, NY, USA). A Fisher exact test and a Mann–Whitney test were used to compare the clinical characteristics. The data were expressed as mean \pm standard deviation. Statistical significance was established at $P < 0.05$.

Table 1. Clinical characteristics, location and type of hernia in both groups

Characteristic	Group A (n = 23)	Group B (n = 940)	P-value
Age (yr)	69.6 \pm 7.2	54.1 \pm 16.1	<0.001
Body mass index (kg/m ²)	23.7 \pm 2.4	22.7 \pm 2.3	0.180
Location (%)			
Right	17 (74.0)	484 (51.5)	0.020
Left	3 (13.0)	344 (36.6)	
Both	3 (13.0)	112 (11.9)	
Type			
Indirect (ID)	21 (91.3)	652 (69.4)	0.023
Direct (D)	2 (8.7)	224 (23.8)	
ID+D	0 (0)	31 (3.3)	
Others	0 (0)	33 (3.5)	

Values are presented as mean \pm standard deviation or number (%).

RESULTS

The mean age of group A was higher than that of group B (69.6 \pm 7.2 vs. 54.1 \pm 16.1, $P < 0.001$) but BMI was not significantly different between the two groups. In terms of the hernia locations and types, hernia on the right side and indirect type were more predominant in group A than in group B with statistic significance ($P = 0.020$ and $P = 0.023$, respectively) (Table 1). The rate of laparoscopic surgery in group B ($n = 862$, 91.7%) was higher than in group A ($n = 14$, 64.3%, $P < 0.001$) (Table 2). In group A, 10 cases were performed with intraperitoneal onlay mesh (IPOM) and 4 cases by trans-abdominal preperitoneal (TAPP). In comparing perioperative variables between the two groups, operative time (49.4 \pm 23.5) and hospital stay (1.9 \pm 0.7) in group A were longer than in group B (38.9 \pm 16.9, 1.1 \pm 0.2, $P = 0.046$ and $P < 0.001$, respectively) and pain score at 7 days in group A was higher than in group B (3.1 \pm 0.7 vs. 2.3 \pm 1.0, $P < 0.001$). Postoperative recurrence rate at median follow-up of 37 months (range, 6 to 54 months) was not significantly different between the two groups (Table 2). There was no conversion from laparoscopic hernia repair to open herniorrhaphy in both groups but concomitant inguinal incision to reduce incarcerated omentum was done in five cases in group B. Seventeen patients (74%) in group A had developed hernia within 3 years after radical prostate cancer surgery (Fig. 1).

DISCUSSION

In 1996, Regan et al. [1] reported for the first time that inguinal hernia was one of the postoperative complications of radical prostatectomy. Their study showed that the incidence of hernia was as high as 12%, and all of the hernias developed within 6 months after the surgery. The number of patients who undergo radical prostatectomy has been increasing

Table 2. Comparison of perioperative variables between group A vs. group B

Variable	Group A (n = 23)	Group B (n = 940)	P-value
Operation types			<0.001
Laparoscopic	14	862	
Open	9	78	
Operative time (min)	49.4 \pm 23.5	38.9 \pm 16.9	<0.001
Pain score	3.1 \pm 0.7	2.3 \pm 1.0	<0.001
Hospital stay (day)	1.9 \pm 0.7	1.1 \pm 0.2	<0.001
Conversion	0	0	
Recurrence	0	3	0.786

Values are presented as mean \pm standard deviation.

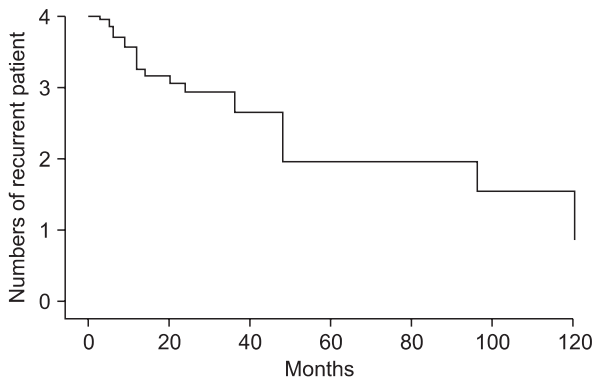


Fig. 1. Time period of inguinal hernia development after radical prostatectomy.

significantly because of the increased use of the PSA test as an effective screening tool for prostate cancer. Inguinal hernia, which has an incidence of 7–21%, is now considered one of the complications of radical prostatectomy, together with erectile dysfunction, urinary incontinence, and vesico-urethral stricture [2–6]. The incidence of postprostatectomy hernia was not reported in this study because all the patients who had inguinal hernia after prostate cancer surgery were transferred to the author's institution from nearby hospitals. All patients who underwent inguinal hernia surgery in this study were more than 20 years old and the incidence of postprostatectomy hernia among total study cases was 2.4% (23/963). While there have been various reports with similar results of inguinal hernia surgery for postprostatectomy patients, almost no statistical analysis has been conducted on most studies. The value of this study is to conduct statistical analysis of hernia patients who had undergone prostate cancer surgery with the hernia patients who had not.

Little is known about the exact mechanism of the occurrence of postoperative inguinal hernia. The age, history of previous hernia surgery, vesico-urethral stricture, BMI [4–6] and a long lower midline incision have been reported as risk factors of hernia development after radical prostatectomy [3–5]. In this study, the risk factors, except age and BMI, were not assessed. The age of the patients with postprostatectomy hernia was higher than that of the patients without a history of such surgery. Old age was not identified as a direct risk factor of hernia occurrence after radical prostatectomy because inguinal hernia is common in the age group of men suffering from prostate cancer [10].

Lodding et al. [4] reported that 95% of inguinal hernia cases after RRP were the indirect type and other studies without a statistical analysis also showed a high incidence of the indirect type [1,6,7,11]. Our study also showed predominant indirect hernia with statistic significance. After laparoscopic examination, the most striking intra-abdominal finding of

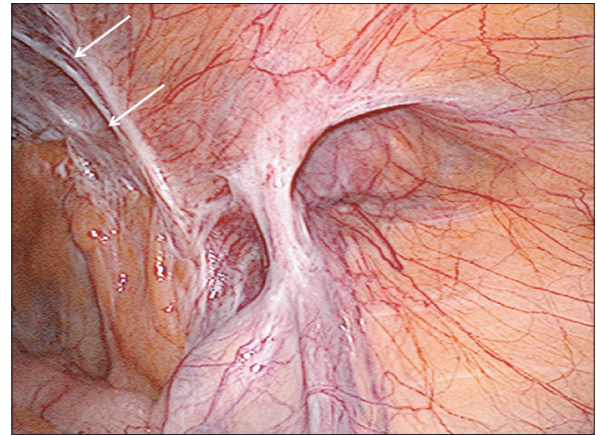


Fig. 2. Fibrotic change in the medial side (white solid lines) of inferior epigastric vessels after radical retropubic prostatectomy.

the inguinal hernia after radical retropubic surgery was the fibrotic change in the medial side to each inferior epigastric vessels, which may be able to strengthen the abdominal wall, in comparison with the lateral side to the inferior epigastric vessels (Fig. 2). At present, we do not know the histological explanation of the strength of the fibrotic scar change in the medial side, but we speculate that this scar change directs the abdominal pressure outward more from medial side to the lateral side of inferior epigastric vessels. This hypothesis will help explain why indirect type is more prevalent in patients who had RRP, but it will need to be examined in animal studies in the future. Furthermore, some studies, including our study, showed higher incidence of hernia on the right side after prostate cancer surgery [4,6,11]. There is more dissection on the left side because most urologists perform the surgical procedures for prostate cancer from the left side which intensifies the fibrosis of the left side. Therefore, it is deemed that the incidence of hernia on the left side would be low.

Laparoscopic hernia surgery has shown some advantages over open surgery in terms of less postoperative pain, earlier return to work, and lower recurrence rate [12–14]. However, it has the possibility of severe complications such as injury of the blood vessels, bladder, or intra-abdominal organs [15–17]. There are three well-described laparoscopic techniques for inguinal hernia repair: the transabdominal approach, such as TAPP and IPOM, and total extraperitoneal (TEP) repair. The present study showed that significantly longer operative time, a longer hospital stay, and more analgesic requirement at 7 days postoperatively were found in hernia patients after radical prostate surgery than in patients who had not received such surgery. This might be explained by the high incidence of laparoscopic surgery (91.7%), especially TEP, in patients without radical prostate surgery. The extraperitoneal approach was attempted on three postprostatectomy hernia patients in

the early period of laparoscopic hernia surgery in the author's institution. The needed space for TEP was not secured, however, so the surgery was performed by the intraperitoneal approach thereafter. The procedures were performed with IPOM (n = 9), because TAPP (n = 4) was difficult in most cases if the fibrosis of the abdominal wall in the retropubic area spread up to the inferior epigastric vessels.

Our study showed that rate of recurrence after hernia surgery was not statistically different in both groups. Long-term follow-up in both groups and more cases in the group of postprostatectomy are needed to determine the accurate assessment of the recurrence rate. Although there are arguments that the risk of prostate cancer surgery is higher in patients who had undergone the TEP or TAPP, there would be no problem if the surgery is performed cautiously. The dominant opinion is that it is difficult to detach the lymph nodes of the pelvis after mesh repair for the inguinal hernia [18–21]. Despite the drawback of retrospective studies, the present study suggests that postoperative fibrosis of the abdominal wall of the retropubic area may be one of the major causes of hernia based on the predominance of indirect type and hernia on the right side.

In conclusion, inguinal hernia following radical retropubic surgery for prostate cancer was predominantly right side and indirect type with statistical significance compared to hernias without previous radical prostatectomy. TEP procedure seems to be not easy for postprostatectomy hernia due to fibrotic changes of the peritoneum in the pelvis.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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