

Experience of Varicocele Management During Ipsilateral Inguinal Herniorrhaphy: A Prospective Study

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Background: This was a prospective study to evaluate the experience of varicocele management during ipsilateral herniorrhaphy in an inpatient urology setting.

Methods: A total of 65 patients with varicocele and inguinal hernia scheduled for herniorrhaphy were included for evaluation. They were categorized into 3 groups. Group 1 ($n=20$) had painful varicocele and underwent simultaneous herniorrhaphy and varicocelectomy; group 2 ($n=20$) had asymptomatic varicocele and received simultaneous herniorrhaphy and varicocelectomy; and group 3 ($n=25$) had asymptomatic varicocele and underwent herniorrhaphy only. We used the Bassini method for herniorrhaphy and inguinal microsurgical varicocelectomy for varicocele. Varicocele was diagnosed by physical examination and further confirmed by Doppler ultrasonography.

Results: The mean follow-up was 30.2 months (range, 6–56 months). Of the 20 subjects in group 1, complete resolution of scrotal pain was noticed in 14 (70%), and 2 (10%) had hydrocele after varicocelectomy. Of the 20 patients in group 2, 1 (5%) had hydrocele after surgery, and no hydrocele was noticed in group 3 after surgery. Mean operation time was significantly longer in group 1 (70.5 ± 15.2 minutes) and group 2 (69.8 ± 14.5 minutes) than in group 3 (38.2 ± 17.2 minutes). One case in group 1 had recurrent varicocele 6 months after surgery. Of the 25 subjects in group 3, 2 (8%) developed painful varicocele during the follow-up period, and both of them had indirect inguinal hernia and lower body mass index.

Conclusion: Simultaneous herniorrhaphy and varicocelectomy are suggested for patients who have inguinal hernia and ipsilateral varicocele, but the average operation time is significantly longer and there is a higher rate of hydrocele than with herniorrhaphy only. [*J Chin Med Assoc* 2010;73(5):248–251]

Key Words: body mass index, herniorrhaphy, inguinal hernia, microsurgical varicocelectomy, varicocele

Introduction

Varicocele is characterized by abnormal tortuosity and dilatation of the veins of the pampiniform plexus within the spermatic cord, and is one of the causes of male infertility. The prevalence of varicocele is 15–20% in the general population and 30–40% in infertile men.¹ Ribarski et al have suggested that mutation 1090C > T in ubiquitin-specific protease 26 of the X chromosome is a genetic risk factor for developing inguinal hernia, which might be associated with male infertility.² Furthermore, 69–81% of men with secondary infertility have

varicocele.^{3,4} In contrast, varicocele might cause scrotal pain or a pulling and dragging sensation, which worsens after straining and exercise.⁵ The definite etiology of varicocele is still unknown. The incidence of pain in patients with varicocele is 2–10%.^{5,6} Varicocelectomy is a widely used treatment for male subfertility, and can be effective for treatment of painful varicocele.⁶ Levinger et al have proposed that varicocele prevalence increases over time, and the risk of incidence increases by about 10% for each decade of life.⁷

Inguinal hernia is a frequent disease in men, with an incidence of 1–2%.⁸ In the United States, inguinal



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hernia is common in elderly men, and heavier men might have a lower risk.⁹ Some believe that an inguinal hernia can be caused by increased intra-abdominal pressure, and some varicocele patients might suffer from scrotal pain after strenuous activity.¹⁰ Coincident finding of varicocele and inguinal hernia is expected to be more frequent compared with previous studies,^{9,10} considering the pathogenesis of both diseases. Therefore, surgeons and urologists see patients with inguinal hernia and varicocele. Information concerning the management of ipsilateral varicocele during herniorrhaphy is scarce. We therefore conducted this prospective study.

Methods

Patients

From January 2004 to January 2009, 65 patients who received herniorrhaphy for inguinal hernia were included for evaluation. Patients were examined in a warm room while standing up, and the scrotum was inspected and palpated. The age range was 20–52 years. Semen analysis and measurement of body mass index (BMI) were performed for all patients. Varicocele was diagnosed by physical examination and confirmed by Doppler ultrasonography. Varicocele was defined as: grade 1, palpable only with Valsalva maneuver; grade 2, palpable without Valsalva maneuver; and grade 3, visible from a distance.¹¹ Inguinal hernia was diagnosed by physical examination, and the symptom was protruding reducible inguinal mass. Patients with strangulated or bilateral inguinal hernia or contralateral varicocele were excluded. Symptomatic varicocele means that patients had ipsilateral scrotal pain caused by varicocele. Pain score on a 10-cm visual analog scale (VAS) was

used to assess preoperative and postoperative scrotal pain. The VAS pain scales were 10-cm horizontal lines drawn on a sheet of paper without any markings, anchored with “no pain” on the left and “worst possible pain” on the right. Group 1 patients had symptomatic varicocele and underwent simultaneous herniorrhaphy and varicocelectomy; group 2 patients had asymptomatic varicocele and also received simultaneous herniorrhaphy and varicocelectomy; and group 3 patients had asymptomatic varicocele and underwent herniorrhaphy only. Patients with asymptomatic varicocele chose which kind of surgery they preferred after having the options fully explained. Hydrocele and recurrent varicocele were diagnosed by physical examination and confirmed by ultrasonography during follow-up.

We used Bassini’s method for herniorrhaphy and microsurgical varicocele ligation (artery and lymphatic sparing) for varicocelectomy.¹¹ All patients gave signed informed consent, and the study was approved by the Institutional Review Board of Taipei City Hospital.

Statistical analysis

We used the χ^2 test and Kruskal–Wallis test for the analysis of experimental data. SPSS version 10.0 (SPSS Inc., Chicago, IL, USA) for Windows was used for statistical analysis. A *p* value <0.05 was considered statistically significant.

Results

The mean ages for groups 1, 2 and 3 were 36.4, 39.5 and 38.6 years, respectively. Age, grade and location of varicocele, operation time, number of ligated veins, and BMI are shown in Table 1. Semen analysis was

Table 1. Baseline characteristics of the patients*

	Group 1 (n=20)	Group 2 (n=20)	Group 3 (n=25)	<i>p</i>
Age (yr)	36.4 ± 10.6	39.5 ± 11.8	38.6 ± 11.1	0.74
Varicocele grade				0.56
1	5 (25)	6 (30)	8 (32)	
2	9 (45)	9 (45)	11 (44)	
3	6 (30)	5 (25)	6 (24)	
Location				0.56
Left	17 (85)	17 (85)	22 (88)	
Right	3 (15)	3 (15)	3 (12)	
Operating time (min)	70.5 ± 15.2	69.8 ± 14.5	38.2 ± 17.2	0.02 [†]
No. veins ligated	9.1 ± 0.9	8.7 ± 0.6	–	0.67
Body mass index	22.7 ± 3.4	23.1 ± 3.1	23.2 ± 3.3	0.31

*Data presented as mean ± standard deviation or n (%); [†]*p* < 0.05 was considered significant. Kruskal–Wallis test was used for analysis of age, operating time, number of ligated veins and BMI. The χ^2 test was used for analysis of grade of varicocele and location of hernia.

normal for all patients, and 9 with right varicocele did not have right retroperitoneal disease. Of the 65 patients, 50 (16 in group 1, 15 in group 2, and 19 in group 3) had indirect inguinal hernia; 13 (4 in group 1, 4 in group 2, and 5 in group 3) had direct inguinal hernia; and 2 (1 each in groups 1 and 3) had both direct and indirect inguinal hernia. No significant difference was noted in age, grade of varicocele, location of hernia, and BMI among the 3 groups, and no significant difference was found in the number of ligated veins between groups 1 and 2 (Table 1). The mean follow-up was 30.2 months (range, 6–56 months). Of the 20 subjects in group 1, VAS pain scores were 6.8 ± 1.4 before varicocelelectomy and 1.6 ± 0.5 after varicocelelectomy. Complete resolution of scrotal pain was noted in 14 (70%) patients, and 2 (10%) had hydrocele after surgery. Of the 20 patients in group 2, 1 (5%) had hydrocele after surgery, and no hydrocele was noted in group 3 after surgery. All 3 patients with hydrocele after surgery had indirect inguinal hernia, grade 3 varicocele and lower BMI (mean, 21.8 *vs.* 22.9).

Mean operation time was significantly longer in groups 1 and 2 than in group 3 (Table 1). One case with grade 3 varicocele and lower BMI (mean, 21.6 *vs.* 22.7) in group 1 had recurrent varicocele 6 months after surgery, but no recurrent varicocele was found in group 2 patients during follow-up. Of the 25 subjects in group 3, 2 (8%) developed painful varicocele during follow-up (1 from grade 1 to grade 2 at 6 months after surgery, and 1 from grade 2 to grade 3 at 9 months after surgery), and both patients had indirect inguinal hernia and lower BMI (mean, 21.9 *vs.* 23.2). No testicular hypotrophy was seen in any patients during post-operative follow-up.

Discussion

A number of techniques have been described for repair of varicocele, including the high retroperitoneal Palomo approach, conventional inguinal approach, microsurgical inguinal or subinguinal approach, laparoscopic approach and radiographic embolization. Microsurgical (artery- and lymphatic-sparing) varicocelelectomy offers the most promising outcomes in terms of spontaneous pregnancy and occurrence of side effects.^{11,12} Microsurgical varicocelelectomy could be performed using a low inguinal or subinguinal approach. Both methods have been shown to have similar clinical outcomes.^{11,13} Therefore, in this study, we used low inguinal microsurgical varicocelelectomy to treat patients with varicocele. The most frequent complication after microsurgical varicocelelectomy is hydrocele, with an incidence of about

0.44%.¹¹ The most serious complication after varicocelelectomy is testicular atrophy, although the chance is very low.¹⁴ Also, the rate of persistent or recurrent varicocele after microsurgical varicocelelectomy is about 1.05%.¹¹ Kumanov et al suggested that BMI had a protective role in the development of varicocele in 6,200 boys aged 0–19 years.¹⁵ Handel et al demonstrated that the prevalence of varicocele decreases with increasing BMI, as increased adipose tissue decreases compression of the left renal vein and prevents detection due to adipose tissue in the spermatic cord.¹⁶ In the present study, 3 (7.5%) patients had hydrocele and 1 (2.5%) had recurrent varicocele after simultaneous varicocelelectomy and herniorrhaphy, which is higher than the chance of recurrent varicocele in varicocelelectomy alone. Furthermore, all 4 of these patients had indirect inguinal hernia, lower BMI and grade 3 varicocele. There are 3 possible reasons for this phenomenon: the higher number of dissection maneuvers performed over the spermatic cord during surgery, the higher grade of varicocele and the lower BMI (which increases the chance of the nutcracker phenomenon, increases hydrostatic pressure in the scrotum, and decreases fat tissue in the spermatic cord).^{15,16} However, the actual etiology needs further evaluation.

Campanelli et al have suggested that modern advances in hernia repair (open *vs.* laparoscopic, with or without mesh) are credited with reducing the rate of recurrence and chronic pain.¹⁷ In this study, we used Bassini's method for hernia repair without mesh, which was the surgeon's preference. Also, herniorrhaphy was performed first, followed by varicocelelectomy, which could have made the microsurgical varicocele repair easier and more complete. de Lange et al showed that early recurrence (<1 year) after herniorrhaphy occurred in 2.2% of all patients and wound infection in about 0.8%.¹⁸ In this study, no recurrent hernia or wound infection was noted during follow-up after herniorrhaphy. Calcagno and Gastaldi reported a case of focal infarction of testis following herniorrhaphy and varicocelelectomy.¹⁹ Nagle et al demonstrated that testicular ischemia and infarction can be shown by radionuclide imaging after herniorrhaphy and varicocelelectomy.²⁰ Furthermore, Marte et al demonstrated that laparoscopic Palomo varicocele sealing is safe and highly successful in correcting varicocele and can also correct the associated inguinal hernia.²¹ We did not see this complication (testicular ischemia and infarction). However, particular attention should be paid to preserve the necessary blood circulation to the testis during simultaneous repair of hernia and varicocele.

Most urologists agree that initial treatment for painful varicocele should be conservative (i.e. scrotal

support, anti-inflammatory medication, or limitation in activity), but there is no consensus on the appropriate duration of this conservative treatment. Complete resolution of pain can be expected in 48–88% of patients who undergo varicocele repair.^{5,6,22} In the present study, similar results were noted, but the benefit of varicocelectomy in infertility needs to be evaluated in different patient cohorts. Additionally, all our patients had normal semen analysis. The most common complaint of patients with varicocele is dull throbbing scrotal pain or a pulling or dragging sensation, which is worsened with straining and exercise.²³ In this study, we used these criteria to define the subjects with painful varicocele, but the scrotal pain might have been due to inguinal hernia. Therefore, we excluded patients with strangulated inguinal hernia. Most urologists suggest regular follow-up for patients with asymptomatic varicocele, but the natural history of varicocele is unclear. In our study, patients chose which kind of surgery they preferred after a full explanation. Cervellione et al demonstrated that about 28% of children with subclinical varicocele progressed to clinical varicocele during a 4-year period.²⁴ In our study, 2 (8%) patients with asymptomatic varicocele developed painful varicocele during follow-up after herniorrhaphy alone, and both had indirect inguinal hernia and lower BMI. This might have been due to the development of adhesion after dissection at the spermatic cord, which obstructed the venous return. At the same time, lower BMI could have resulted in poor relief of the nutcracker phenomenon, which led to progression of varicocele. However, the sample size in this study was small; therefore, further study and longer follow-up with a larger number of cases is required for fuller evaluation of this issue.

In conclusion, simultaneous herniorrhaphy and varicocelectomy are suggested for patients who have inguinal hernia and ipsilateral varicocele. However, surgery time is longer and a higher rate of hydrocele and recurrent varicocele are noted in these cases than when herniorrhaphy alone is performed, especially in patients with lower BMI and grade 3 varicocele.

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