Original Article

A study of contralateral occult inguinal hernia in adult male patients undergoing total extraperitoneal herniorraphy

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Abstract

Background: The incidence of contralateral occult hernia (COH) varies from 4.2% to 57.5%. Total extraperitoneal (TEP) gives us opportunity to visualize contralateral groin for occult hernia and its simultaneous repair. Ultrasonography (USG) helps to diagnose occult hernia preoperatively with detection rate of 96.6% with specificity 84.4%. **Objective:** The aims of this study were to identify the incidence of contralateral occult inguinal hernia in clinically diagnosed unilateral inguinal hernia patients using USG as diagnostic modality and to compare the clinical outcomes of unilateral TEP vs. bilateral TEP with respect to pain, duration of hospital stay, time for return to normal work, and postoperative complications. **Setting and Design:** This was a prospective observational, single-center study. **Materials and Methods:** A total of 30 male patients were included in the study who was having clinically diagnosed unilateral hernia. All patients were assessed by USG for contralateral occult inguinal hernia. **Results:** Incidence of COH was 10%, two (6.7%) had indirect defect, and 1 (3.3%) had direct defect. Two (6.7%) patients underwent bilateral TEP and 28 (93.3%) underwent unilateral TEP. No significant difference was observed in terms of mean duration of hospital stay, duration of surgery, and visual analog scale score for pain in both unilateral and bilateral TEP. The mean for resuming daily work in unilateral TEP was 4.86 ± 0.833 days and in bilateral TEP the mean was 7.50 ± 0.70 days and this showed statistically significant difference ($P < 0.001$). **Conclusion:** Patients with COH should be counselled for synchronous repair as there is no significant difference in clinical outcomes of unilateral and bilateral TEP. On the basis of this pilot study, it can be concluded that preoperative USG is mandatory for diagnosis and simultaneous management of preexisting contralateral hernia.

Keywords: Contralateral occult hernia, total extraperitoneal herniorraphy, ultrasonography

Introduction

Laparoscopic total extraperitoneal (TEP) is now considered the standard of care for bilateral and recurrent inguinal hernia treatment. TEP helps us to identify clinically undiagnosed hernias with minimal additional dissection.[1] Since Ferzli's implementation of this technique in 1992, there were several reports of bilateral inguinal hernia repair in patients with contralateral defects.[2-4] However, the incidence of occult contralateral inguinal defects in those patients diagnosed with a pure unilateral hernia is not well known. There are now several surgeons who prefer bilateral exploration during TEP.[5] It allows for the repair of contralateral "occult" hernias in up to 25% of patients who clinically present with a unilateral hernia on physical examination.[1,6] Groin ultrasound may be a better method for improving the diagnosis of contralateral

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occult inguinal hernia than contralateral exploration during TEP.[7] Ultrasonography (USG) is reliable, easily accessible, and noninvasive diagnostic with 96.6% sensitivity and 84.4% specificity for groin hernia detection.[8] Ultrasonographic preoperative examination of the contralateral side prevents blind exploration of the normal side during TEP.[9] The primary aim of our study was to identify the incidence of contralateral occult hernia (COH) in clinically diagnosed unilateral inguinal hernia patients using USG as diagnostic modality. The secondary aim of this study is to compare the clinical outcomes of unilateral and bilateral TEP in terms of pain, duration of surgery, length of hospital stay, time for return to normal work, and postoperative complications.

Materials and Methods

After obtaining ethical approval from ethical committee of institute, this prospective observational study was carried out in Department of General Surgery in collaboration with Department of Radiodiagnosis and Imaging, Institute of Medical Sciences, Banaras Hindu University, Varanasi, from August 2017 to July 2019. A detailed proforma was filled up to record information regarding patient history, physical examination, and radiological investigation. USG was carried out for every case of clinically diagnosed unilateral inguinal hernia patients to look for COH. In the case of contralateral occult inguinal hernia, bilateral TEP was performed after patient consent, and unilateral TEP was performed if there was no COH and in patients who had contralateral occult defect but did not give consent for bilateral TEP.

A total of 30 male patients age range 14–60 years were included in the study who was having clinically diagnosed unilateral hernia. USG parameters defined by Department of Radiodiagnosis were anatomical integrity of inferior epigastric vessels, defect in internal ring, and defect in posterior wall. Assessment was performed in resting position and in stress maneuver (Erect posture/valsalva). Postoperative pain was assessed using visual analog scale (VAS) score (0–10), score 0 is no pain and score 10 is worse pain. Patients with age under 14 years and over 60 years, obstructed or strangulated hernia, previous abdominal surgery, recurrent and bilateral hernia, uncorrected coagulopathy, and unfit for general anesthesia were excluded from the study.

Data were analyzed using Statistical Package for the Social Sciences (SPSS) software program, version 23.0 for Windows (IBM, Chicago, Illinois). For categorical variables, Chi-square test and Fisher's exact test were used. Student's *t* test was used to compare the mean of two groups. A value of $P < 0.05$ was considered statistically significant.

Results

The mean age of patients was 40.5 ± 15.5 years (range 19–60 years) and majority of cases (40%) had age range from 51 to 60 years. Majority of cases (73.3%) had clinically diagnosed hernia on right-side and eight (26.7%) had left-side hernia. On USG assessment of contralateral side inferior epigastric artery moves medially in two (6.7%) on stress and moves laterally in one (3.3%) patient on stress only. No movement of inferior epigastric artery was found in resting position. In two (6.7%) patients defect in internal ring was present in both resting and stress and in one patient (3.3%) defect was found in posterior wall of inguinal canal [Table 1]. So overall occult hernia was present in three (10%) patients, of which two had indirect and one had direct hernia. All three COH were found in left side in patients with right-sided clinical hernia.

Of 30 patients, 28 (93.3%) had indirect hernia, 1 (3.3%) had direct hernia, and 1 (3.3%) had pantaloon hernia. Preoperative diagnosis was same as clinical diagnosis. Of 30 cases, right TEP was carried out in 20 (66.7%) patients followed by left TEP in 8 (26.7%) patients and bilateral TEP was carried out in 2 (6.7%) patients who were found to have COH and gave consent for bilateral repair. It was observed that 96.7% (29 patients) required three doses of nonsteroidal anti-inflammatory drugs (NSAID) analgesic and 1 (3.3%) required only 1 dose of NSAID analgesic in first 24 h. All patients were discharged on postoperative day 1 (POD1) and mean hospital stay was 24 h.

The mean duration of surgery was 99.29 ± 25.08 min in unilateral TEP and in bilateral TEP it was 120.00 ± 42.43 min, which was statistically insignificant ($P = 0.284$). Patients who underwent unilateral TEP, the mean for resuming daily work was 4.86 ± 0.83 days and in bilateral TEP the mean was 7.50 ± 0.70 days and this showed statistically significant difference ($P < 0.001$). The mean VAS score for unilateral TEP was 1.36 ± 0.62 in first 24 h of surgery and in bilateral TEP the VAS score was 1.50 ± 0.70, which was comparable but statistically insignificant ($P = 0.757$). In unilateral and bilateral TEP, there were no wound infection, inguinal hematoma, inguinodynia, and testicular discomfort in any patient. In unilateral TEP, edema of cord was present in two (7.1%) patients and no cord edema was present in bilateral TEP [Table 2].

Discussion

There is a growing occurrence of occult contralateral hernia on laparoscopic assessment during TEP.[10-12] But the possibility of

Table 1: Ultrasonographic assessment of contralateral side

	Resting		Stress (Valsalva maneuver)	
	No.	Percentage	No.	Percentage
a. Anatomical integrity of inferior epigastric artery				
Normal	30	100	27	90.0
Moves medially	0	0	2	6.7
Moves laterally	0	0	1	3.3
b. Defect in internal ring	2	6.7	2	6.7
c. Defect in posterior wall	0	0	1	3.3

occult contralateral hernia in patients with clinically unilateral inguinal hernia is doubtful and patient may undergo unnecessary contralateral exploration. To prevent this, both patients had to undergo a preoperative ultrasonic examination of the contralateral side to look for occult hernia. In our study, only three (10%) patients were found to have contralateral occult inguinal hernia on preoperative ultrasound assessment. All three patients were advised to go for bilateral TEP but only two agreed for synchronous repair of both side and ultrasound findings were confirmed intra operatively and in these two patients sensitivity came out to be 100% for detection of occult defect. Two (6.7%) patients who underwent bilateral TEP had contralateral indirect occult hernia. However, in a meta-analysis performed by Robinson *et al.*[8] sensitivity and specificity of USG for detection of inguinal hernia were 96.6% and 84.4%, respectively. In a similar study conducted by Malouf *et al.*,[9] 34.6% patients with a clinically unilateral hernia had COH on preoperative ultrasonographic assessment and all of them accepted to go for repair of both defects in same setting. In this study, it was found that all three patients had occult hernia on left side; however, Bochkarev *et al.*[12] found prevalence of right-side occult hernia (86%) over left side (14%) during TEP. Griffin *et al.*[11] reported 11%–51% incidence of COH in clinically diagnosed unilateral inguinal hernia patients during laparoscopic hernia repair. Crawford *et al.*[10] discovered in 37 (51%) of 73 patients with a unilateral inguinal hernia an occult contralateral defect during laparoscopic exploration and majority of the occult defects involved were direct inguinal hernias. Sayad *et al.*[6] and Koehler *et al.*[1] have previously reported the rate of occult contralateral hernias found during TEP repair to be 11% and 13%, respectively. In a recent study, Imai *et al.*[13] reported that 23 (15.1%) patients who underwent hernia repair using laparo-endoscopic technique had occult contralateral hernia.

As stated earlier in our study, right-sided TEP was performed in 20 (66.7%) patients followed by left-sided TEP in 8 (26.7%) patients and bilateral TEP was performed in 2 patients (6.7%) only. Of 30 patients, 29 (96.7%) patients required three doses of NSAID analgesic and 1 (3.3%) patient required only one dose of NSAID analgesic in first 24 h and mean VAS score for unilateral TEP was 1.36 ± 0.621 in first 24 h of surgery and in bilateral TEP the VAS score was 1.50 ± 0.707, which was comparable but statistically insignificant ($P = 0.757$). Malouf *et al.*[9] compared VAS score between patients undergoing unilateral and bilateral TEP at 2 and 6 weeks and they found that VAS scores were lower in unilateral TEP at 2 weeks ($P = 0.02$) but not at 6 weeks ($P = 0.2$). Among cases undergoing unilateral/bilateral TEP, all were discharged on POD1. So the mean duration of hospital stay was 24 h for both unilateral and bilateral TEP and it was statistically insignificant. Chiang *et al.*[7] found that mean duration of hospital stay for unilateral TEP was 2.4 days and for bilateral TEP it was 2.6 days ($P = 0.341$) and the result was comparable but statistically insignificant. The mean duration of surgery in this study for unilateral TEP was 99.29 ± 25.08 min and for bilateral TEP mean duration of surgery was 120.00 ± 42.42 min, which was statistically insignificant ($P = 0.284$). However, in a study conducted by Kockerling *et al.*,[14] the mean duration of operation for unilateral inguinal hernias in TEP technique was 44.7 min (range 20–275 min), and for bilateral inguinal hernias it was 60.3 min (range 20–270 min), which was statistically significant ($P = 0.0001$). Chiang *et al.*[7] also found significant difference in mean duration of surgery for unilateral TEP (59.8 ± 29 min) and bilateral TEP (85.2 ± 33 min), which was also statistically significant ($P = 0.001$). Bochkarev *et al.*[12] reported that mean duration of surgery for unilateral TEP was 38.7 min and for bilateral TEP it was 53.9 min, which is comparable to this study [Table 3].

Table 2: Comparison of clinical outcomes of total extraperitoneal herniorraphy for unilateral and bilateral hernia

	Unilateral (*n*=28)	Bilateral (*n*=2)	*P*
Duration of surgery (min)	99.29±25.082	120.00±42.426	0.284
Resuming daily work (days)	4.86±0.833	7.50±0.70	<0.001
VAS score	1.36±0.621	1.50±0.707	0.757
Wound infection	0 (0.0)	0 (0.0)	0
Inguinal hematoma	0 (0.0)	0 (0.0)	0
Testicular discomfort	0 (0.0)	0 (0.0)	0
Edema of cord	2 (7.1)	0 (0.0)	0.999
Inguinodynia	0 (0.0)	0 (0.0)	0.0

VAS=visual analog scale

In this study no intraoperative organ injuries were noted, whereas in study conducted by Kockerling *et al.*[14] no significant difference was found in overall number of intraoperative complications between unilateral and bilateral groups ($P = 0.31$); a significant difference was noted for intraoperative organ injuries, which were higher for bilateral TEP ($P = 0.018$) that was essentially due to the significantly higher number of urinary bladder injuries in bilateral TEP at 0.26% as compared with 0.04% for unilateral TEP.

In this study, patients who underwent unilateral TEP, the mean for resuming daily work was 4.86 ± 0.833 days and in bilateral TEP the mean was 7.50 ± 0.70 days and this showed statistically significant difference ($P < 0.001$) [Table 3]. Bochkarev *et al.*[12] found that mean for resuming daily work in unilateral TEP was 6.2 (5–8) days and for bilateral TEP it was 8.4 (6–14) days, which was comparable to our study. In unilateral and bilateral TEP, there were no wound infection, inguinal hematoma, inguinodynia, and testicular discomfort in any patient. In unilateral TEP, edema of cord was present in two (7.1%) patients and in bilateral TEP no patient had edema of cord and this difference may be by chance as only two patients underwent bilateral TEP. However, in study conducted by Chiang *et al.*,[15] in patients undergoing unilateral TEP, 3% developed postoperative inguinal hematoma and in patients undergoing bilateral TEP, 4% developed postoperative inguinal hematoma. Wound infection was only present in one patient who underwent unilateral TEP. Bochkarev *et al.*[12] found that among all patients undergoing unilateral TEP, seven patients developed inguinal hematoma and four patients developed edema of cord and those undergoing bilateral TEP, three were developed inguinal hematoma and

Table 3: Comparison of clinical outcomes of this study and other studies

Clinical variables	This study (2019)		Chiang *et al.*[16]		Bochkarev *et al.*[12]	
	U/L TEP (*n*=28)	B/L TEP (*n*=2)	U/L TEP (*n*=269)	B/L TEP (*n*=44)	U/L TEP (*n*=78)	B/L TEP (*n*=22)
Duration of surgery (min)	99.3±25.0	120.0±42.4	59.8±29	85.2±33	38.7	7.037 53.9
Resuming daily work (days)	4.8±0.8	7.5±0.7	-	-	6.2	8.4
VAS score	1.36±0.62	1.50±0.70	-	-	-	-
Wound infection	0	0	1	0	0	0
Inguinal Hematoma	0	0	10	2	7	3
Testicular Discomfort	0	0	-	-	-	-
Edema of cord	2	0	-	-	4	1
Inguinodynia	0	0	-	-	-	-

TEP=total extraperitoneal, VAS=visual analog scale, U/L=unilateral, B/L=bilateral

one developed edema of cord. In a study conducted by Malouf *et al.*,[9] complication rate in unilateral TEP patients was 6.8% and in patients who were diagnosed to have COH on USG and underwent bilateral TEP, complication rate was 13% which was comparable. This study is having better postoperative clinical outcomes than that of studies conducted by Chiang *et al.*[7] and Bochkarev *et al.*[12]

In our study, only two patients developed edema/thickening of cord at 1 month of follow-up. There was no recurrence of hernia and no clinically detectable hernia on normal side (contralateral) after 12 months of follow-up. Thumbe *et al.*[16] found that 28.6% of patients having occult hernia developed metachronous clinical hernia after 12 months of follow-up. In a study designed to determine if repeat TEP repair was feasible, Ferzli *et al.*[15] noted 8 of 549 patients (1.5%) presented with contralateral hernias between 13 months and 6 years after unilateral repair. Similarly, Saggar *et al.*[17] reported 6 of 446 unilateral repairs (1.3%) developed a clinically detectable contralateral hernia between 10 and 82 months after unilateral repair. In a randomized trial comparing observation or surgery for asymptomatic hernias, Chung *et al.*[18] reported that 16 of 160 patients (10%) developed a new contralateral hernia within 7.5 years. Clinical contralateral metachronous hernia occurrence after unilateral repair is not uncommon. If this significant problem could be diagnosed and treated during the initial primary repair, the risk of further operation, another anesthesia, another sick leave, and another medical expense could be avoided.[19]

The main limitation of this prospective observational study was having limited ($n = 30$) number of patients and also study period was 2 years only in which follow-up of patients was 1 year.

Conclusion

USG is a simple, noninvasive, and readily available diagnostic tool for the preoperative evaluation of occult inguinal hernia on contralateral side. Patients diagnosed with COH should be recommended for synchronous repair since there is no significant difference in outcome of unilateral and bilateral TEP. On the basis of this pilot study, it can be concluded that preoperative USG is necessary for the diagnosis and simultaneous treatment of preexisting contralateral hernia. Thus, in significant numbers of cases unnecessary exploration for contralateral hernia without preoperative USG findings can be avoided.

Ethical clearance

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Conflicts of interest

There are no conflicts of interest.

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