■ ***Original Article***

A prospective study on clinical outcome of complicated external hernias

VC Shakya, CS Agrawal, S Adhikary
Department of Surgery, BPKIHS, Dharan, Nepal

Abstract

Background: External hernias are relatively simple diseases in themselves to treat; however, complications developing in them, such as irreducibility, obstruction and strangulation, may present as a life-threatening one. **Objective:** To study the characteristics of these patients and identification of risk factors that may predict development of these complications would help place the patient in a high-risk group and subsequent intervention. **Methods**: It is a prospective descriptive study in patients presenting to Surgery Department of BPKIHS, Dharan, Nepal with a diagnosis of complicated external hernias from December 2009 to July 2011. **Results**: There were a total of 63 patients including 53 males (84.1%) and 10 females (15.8%). The average age of the patients was 49.23±21.4 years (range 10 days-85 years). The average duration of hernia was 6.36±6.57 years (range 5 hours -30 years). The median duration of complications was 2 days (range 5 hours-15 years). There were 7 mortalities (11.11%). The morbidity rate was 33.33% (21 cases). Risk factors identified for mortality were age >65 years ($p=0.004$), inguinal hernias ($p<0.001$), presence of co-morbid diseases ($p<0.001$), presence of strangulation ($p=0.007$) and bowel resection ($p<0.001$); and for morbidities were type of hernia ($p<0.001$), presence of co-morbid diseases ($p=0.013$), and bowel resection ($p=0.002$). **Conclusion**: Elderly males with co-morbid diseases with inguinal hernia and with strangulation and needing bowel resection are most likely to die from more complications. Such patients when seen in the outpatient department should be given priority admission and taken up for early elective surgery.

Keywords: hernia; irreducible; obstruction; strangulation

Introduction

Hernias are relatively an innocuous disease on itself and they commonly present as uncomplicated reducible swellings operated in an elective setting, but sometimes their complications as irreducibility, obstruction and strangulation compel the patient to present to the emergency, and delay in presentation is known to result in high morbidity and mortality as well. [1,2] Complications of hernia are known to occur both in adults as well as in children,[1,2] and in inguinal as well as femoral hernias,[3-5] and not only the groin hernias (the commonest hernias), but of the anterior abdominal wall as well. [6-9] These complications are far more dangerous, troublesome and difficult to manage resulting in a dramatic increase in the morbidity and mortality of the disease in developing as well as developed countries.[10-13] A study is direly needed which would clarify the pattern of complications that have been encountered in our institute and their magnitude. This study is intended to improve our awareness on different types of external hernias that produce complications.

Address for correspondence:
Dr Vikal Chandra Shakya, Assistant Professor
Department of Surgery
BPKIHS, Dharan, Nepal
Email: vikalcsh@yahoo.com

Methods

The study is a prospective descriptive study in patients presenting to Surgery Department of B. P. Koirala Institute of Health Sciences, Dharan, Nepal with a diagnosis of complicated hernias from December 2009 to July 2011. The study analyzed the following parameters regarding the course of the disease and their outcome:- sex, age, type of hernia, clinical features, duration of symptoms, co-morbid conditions, pre-operative management, surgical procedure, operative findings, intraoperative complications, hospital stay, and postoperative complications. The patients were followed up after 15 days, 1 month and 6 months postoperatively and were assessed for any complications. Data collected was entered and

analyzed using SPSS version 12. Risk factor analysis has been done by Chi-square test. P-value <0.05 was considered significant.

Results

There were 63 patients out of a total of 457 hernias (13.78%) including 53 males (84.1%) and 10 females (15.8%). The male to female ratio was 5.3:1; out of 54 inguinal hernias, there were only 2 females (male-female ratio 27:1) and in 7 femoral hernias, there were 5 females (male-female ratio 1:2.5). The average age of the patients was 49.23±21.4 years (range 10 days-85 years). Maximum patients belonged to the age group 50-60 (12, 19.04%), followed by 30-40 years (11, 17.46%), and 60-70 (11, 17.46%), then 70-80 (8, 12.69%), 40-50 (7, 11.11%), 20-30 (6, 9.52%), <10 (4, 6.34%), 10-20 (2, 3.17%) and >80 yrs age group (2, 3.17%) (Figure 2).

Figure 1 : Age distribution of the patients

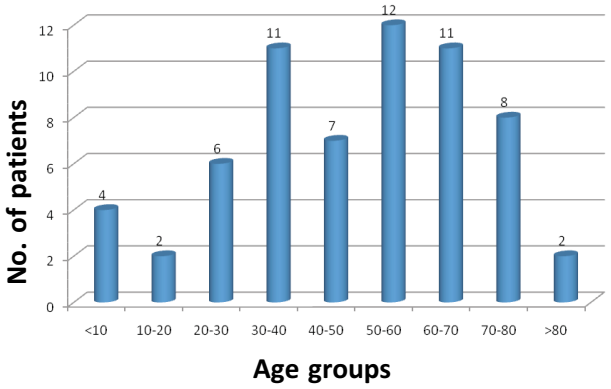
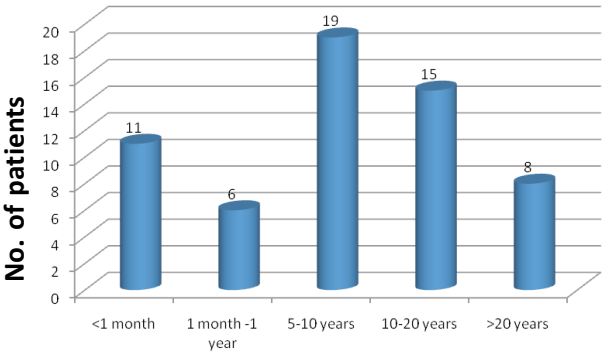
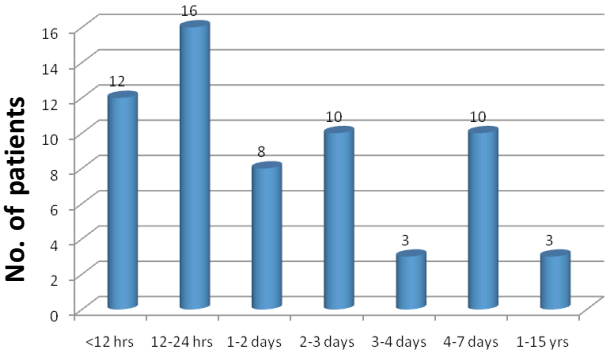


Figure 2: Duration of hernia of the patients



Inguinal hernia was the commonest hernia, seen in 54 cases (85.71%), indirect in 52 and direct in 2, femoral hernia in 7 cases (11.11%), incisional hernia in 1 (1.58%) and umbilical hernia in 1 case (1.58%). The hernias were right-sided in 44 cases (69.84%) and left-sided in 17 cases (26.98%), the incisional hernia and of course umbilical hernia were midline defects. The right-to-left ratio for all groin hernias overall was 2.58:1; and for inguinal hernias the ratio was 3.85:1 and for femoral hernias the ratio was 1.33:1. Four (out of 17, 23.52%) hernias on the left side were strangulated, whereas in 21 cases (out of 44, 47.72%) involving the right side, the contents were strangulated. In femoral hernias, 3(42.85%) were strangulated or obstructed; and in inguinal hernias, 32 (59.25%) were either strangulated or obstructed. Two (3.2%) hernias were recurrent, both were inguinal. The average duration of hernia was 6.36±6.57 years (range 5 hours -30 years) (Figure 2). The average duration of complications was 112.75±706.48 days (range 5 hours-15 years), with median being 2 days (Figure 3). The mean preoperative stay of the patients was 19.5±35.88 hours (2 hrs-10 days), median being 10 hours.

Figure 3: Duration of complications in hernia patients



Regarding clinical features, pain was present in 57(90.47%) cases, swelling was present in 60(95.23%) cases, the swelling was tender in 45(75%) patients, vomiting was present in 34(53.96%) cases (Table 1). Twenty-one patients (33.33%) presented with distension of abdomen, 14(22.22%) presented with constipation and 11(17.46%) presented with obstipation. Bleeding per rectum was present in 1 case (1.58%). Eighteen patients (28.57%) had dehydration, and 3 patients (4.76%) presented in shock. Co-morbid conditions were present in 35 cases (55.55%). Only five patients (7.9%) were previously seen in the outpatient department of our institute. Inguinal exploration and herniorrhaphy was done in 32 patients (52.45%), mesh hernioplasty was done in 10 patients (16.39%), in femoral hernia, anatomical closure of the femoral ring was done followed by either inguinal herniorrhaphy or hernioplasty in 4 patients (6.55%).

In 5 children (8.19%), only herniotomy was done. Exploratory laparotomy was done in 8 cases (13.11%), because the diagnosis was oblivious in 2, because there was no swelling preoperatively and hernia was found only on laparotomy, other 4 cases required laparotomy because of presence of obstruction or peritonitis.

Regarding the nature of the hernia, it was strangulated in 24(38.09%), irreducible in 24(38.09%), obstructed in 7(11.47%) and umbilical hernia and incisional hernia each (1.58%) presented with rupture (Table 2). Three patients (4.76%) presented with irreducibility of more than 5 years duration. The contents of the hernia were ileum only (in 28, 44.44%), omentum only (in 9, 14.28%), ileum with omentum (in 9, 14.28%), sigmoid with omentum (in 4, 6.34%), sigmoid only (in 3, 4.76%), cecum with appendix (in 3, 4.76%), cecum with terminal ileum and omentum (in 1, 1.58%), jejunum (in 1, 1.58%), w-loop of proximal and terminal ileum (in 1, 1.58%) and peritoneal fluid (in 1, 1.58%). Bowel resection was required in 12 cases (19.04%), omentum was resected in 5(7.93%), closure of bowel perforation was done in 2 patients (3.17%) and only reduction of the contents was done in the rest 44 patients (69.84%). In 2 patients (3.17%), stoma was created. Four patients (6.34%) required transfusion during the stay.

Table 1: Clinical presentation of the patients

	Symptoms and signs	No.	%
1	Swelling	59	93.65
2	Pain	57	90.47
3	Vomiting	34	53.96
4	Distension	21	33.33
5	Constipation	14	22.22
6	Bleeding per rectum	1	1.58
7	Rupture	2	3.17
8	Dehydration	18	28.57
9	Tenderness	45	75
10	Shock	3	4.76
11	Co-morbid conditions	35	35

Table 2: Nature of hernia

	Nature of hernia	No.	%
1	Strangulated	24	38.09
2	Irreducible	24	38.09
3	Obstructed	7	11.11
4	Ruptured	2	3.17
5	Total	63	100

The operation was done after a mean period of 19.5±35.88 hours (2 hrs-10 days), median being 10 hours. Two patients could not be extubated due to multiple problems and ICU beds were not available and they were sent to ward and kept on manual ventilation. Drains were kept in 46 patients for a mean period of 3.54±1.76 days (range 2-8 days). The patients passed stool after a period of 1.74±0.67 days (range 1-3 days), and oral feeding was started after a mean postoperative period of 2.11±0.98 days (range 1-5 days). The average duration of postoperative stay was 4.42±3.44 days (range 2 hrs -21 days) and average duration of hospital stay was 5.39±3.47 days (range 1-22 days).

Table 3: Morbidities to the patients

	Morbidity	No.	%
1	Wound infection	8	12.69
2	Pneumonia	5	7.93
3	Renal failure	3	4.76
4	Postoperative hypotension	2	3.17
5	Intraabdominal collection	2	3.17
6	Oral candidasis	1	1.58
7	Liver dysfunction	1	1.58
8	Hepatic encephalopathy	1	1.58
9	Hyponatremia	1	1.58
10	Testicular swelling and edema	1	1.58
11	Scrotal cellulitis	1	1.58
12	Hydrocele	1	1.58

There were 7 mortalities (11.11%); the cause of death was severe metabolic acidosis with pneumonia and sepsis in 4 patients and postoperative myocardial infarction in 1 patient, anastomotic leak in 1, ARDS and sepsis in 1. The morbidity rate was 33.33% (21 cases). Those following complications were noted: wound infection (8 cases), pneumonia (5 cases), persistent post-operative fever (1 case), renal failure (3 cases), postoperative hypotension (2 cases), intraabdominal collection (2 cases), oral candidasis (in one), liver dysfunction (in one), liver dysfunction and hepatic encephalopathy (in one), hyponatremia (in one), myocardial infarction (in one), scrotal cellulitis (in one), adult respiratory distress syndrome (in one), testicular swelling and edema (in one), and hydrocele (in one) (Table 3). The 56 patients (35.28%) alive followed regularly with a mean follow-up period of 4.33±2.45 months (range 1.2-7.67 months), no recurrences have been noted. Among the risk factors for mortality and morbidities regarding groin hernias; age, gender, type of hernia, duration of symptoms, presence of co-morbid diseases, strangulation of the contents and bowel resection were evaluated. Risk factors for mortality identified were age >65 years

(p=0.004), inguinal hernias (p<0.001), presence of co-morbid diseases (p<0.001), presence of strangulation (p=0.007) and bowel resection (p<.001) (Table 4). Risk factors for morbidities were type of hernia

(p<0.001), presence of co-morbid diseases (p=0.013), and bowel resection (p=0.002) (Table 5).

Table 4: Factors associated with mortality

	Factors		Mortality		n	P-value
			No	Yes		
1	Age	Age>65	11	4	15	0.004
		Age<65	43	3	46	
2	Gender	Male	47	6	53	0.922
		Female	7	1	8	
3	Type of hernia	Inguinal	47	7	54	<0.001
		Femoral	7	0	7	
4	Duration of symptoms	>12 hours	43	6	49	0.703
		<12 hours	11	1	12	
5	Co-morbid diseases	Yes	25	7	32	<0.001
		No	29	0	29	
6	Strangulation	Yes	18	6	24	0.007
		No	36	1	37	
7	Bowel resection	Yes	8	6	14	<0.001
		No	46	1	47	

Table 5: Factors associated with morbidity

	Factors		Morbidity		n	P-value
			No	Yes		
1	Age	Age>65	8	7	15	0.187
		Age<65	33	13	46	
2	Gender	Male	36	17	53	0.760
		Female	5	3	8	
3	Type of hernia	Inguinal	37	17	54	0.001
		Femoral	4	3	7	
4	Duration of symptoms	>12 hours	32	17	49	0.521
		<12 hours	9	3	12	
5	Co-morbid diseases	Yes	17	15	32	0.001
		No	24	5	29	
6	Strangulation	Yes	16	9	25	0.424
		No	25	11	36	
7	Bowel resection	Yes	6	8	14	0.026
		No	35	12	47	

Discussion

Elective surgery for groin hernias, even in elderly patients is known to be a very safe procedure with almost negligible mortality.[4,5,9] However, emergency surgery for obstructed and/or strangulated hernias in these patients is associated with significant mortality and morbidity. This is especially true for an older patient with co-existing medical illness who has gangrenous hernial sac contents which require a major surgical intervention.

In the present study, complications occurred most commonly in adults with groin hernia in the 50-60 years age group and the average age was 49.23±21.4 years. Andrews found 68 years to be the average age for complicated hernias,[14] whereas Hancock found 66 years to be the average age.[15] McEntee et al found a peak incidence for strangulation in the eighth decade.[16] Hernias, both simple and complicated, occur more commonly in males. Women appear to be considerably less affected by any type of groin hernia. Andrews and McEntee et al found a high incidence of complicated hernias in men.[14,16] In the present study, the male to female ratio is 5.3:1, consistent with previous studies.[17] A probable explanation for this may be a longer length of the hernial sac that invariably reaches the base of the scrotum in males. Inguinal hernias are common in males and femoral hernias more common in females although females develop inguinal hernias more commonly than femoral. For inguinal hernias the ratio was 27:1, but it was different for femoral hernias, where the ratio was 1:2.5. Andrews found the male to female ratio for inguinal hernia as 6.8:I and for femoral hernia as 1:4.[14]

Most groin hernias occur on the right side whether complicated or simple, inguinal or femoral. The anatomical basis of this may lie in the attachment of the small bowel mesentery and so bowel loops attached to the right of the midline can more easily remain in the right groin than those attached to the left. Aird and Mrdyll quoted a predominance of right-sided groin hernias.[18,19] Andrews found a right-to-left ratio of 2.9:1 for inguinal and 1.8:1 for femoral hernia.[14] The present study revealed similar right-to-left ratios of 2.58:1; and for inguinal hernias the ratio was 2.85:1 and for femoral hernias the ratio was 1.66:1. With complicated hernias, right-sided ones have gangrenous contents significantly more often than left-sided. McEntee et al found that strangulation occurred more commonly on the right side.[16] In the present study also, 47.72% of right sided hernias were strangulated, whereas only 23.52% of the left sided hernias had strangulation. Femoral hernias are known to complicate more common than inguinal hernias, probably due to the anatomical structure of the hernia rings through which the hernial sac passes. Femoral hernias have tight unyielding hernial rings whereas direct inguinal hernias have no well-defined hernial ring. The viability of contents is

also affected by the type of hernia and as expected, complicated femoral hernias are known to strangulate more often than indirect or direct hernias. In the present study, 42.85% of all femoral hernias were strangulated or obstructed; and in inguinal hernias 59.25% were either strangulated or obstructed; which is in sharp contrast to the classical finding.

Duration of hernia has been a significant risk factor which is a predictor of complications in a groin hernia. In general, hernias of short duration appear to strangulate more commonly than long-standing ones. The explanation lays in the relative rigidity of the hernial ring when a hernia appears first and its gradual stretching and laxity as time passes. In our study there was an average period of presentation of 6.36±6.57 years (range 5 hours-30 years) and average duration of complications was 112.75±706.48 days (range 5 hours-15 years), with median being 2 days Andrews found a mortality rate of only 1.4% when the patients were hospitalized within ûrst 24 hours of the incarceration.[14] This rate reached 10.0% and even 21.0% if there was a delay in hospitalization (24 to 47 hours and 48 hours or longer, respectively). Ashirov and Melavannyi also stated that all the patients who died were admitted to the hospital more than 2 days after incarceration.[20] Gallegos et al found the rate of increase of cumulative probability of strangulation in a hernia to be the greatest in the first 3 months of its presence.[21] In the present study, of all patients with complicated hernias, only five patients (7.9%) were seen previously in the outpatient department and put on the waiting list for elective surgery. McEntee et al found only 4% of patients with strangulated hernia on the waiting list for elective repair.[16] The cause of delay in hospitalization may seem patient's fault, but physician errors may be equally responsible because the reasons may be first, lack of public awareness of the dangers of hernia complications; and second, reluctance on behalf of the non-surgical medical personnel to refer patients with known risk factors.[4] McEntee and coworkers reported that groin swelling had not been detected in 30% of their patients with strangulated hernias.16 In this study also, in 2 patients, a complicated hernia was previously not diagnosed and only found on laparotomy. Askew and colleagues also stated that strangulated hernias were misdiagnosed by the general practitioner in 33% of the patients and by their hospital registrar at a rate of 15%.[22] Similarly, Nesterenko and Shovskii found that the cause of late hospitalization was physician error in the prehospital stage in 12.1% of the patients with incarcerated inguinal hernia.[23] Our hospital serves a patient population mostly coming from rural areas of the eastern region of Nepal and nearby region of India. This may be the main reason why the vast majority of the patients in the present series were admitted to the hospital 48 hours or more from the onset of symptoms.

The nature of contents of a complicated hernial sac is important in two respects: the anatomical structure involved and its viability. The present study revealed small bowel as the most common content of a hernial sac. This was also observed by Andrews and Amos.[14,24] Risk factors for mortality identified were age >65 years, inguinal hernias, presence of co-morbid diseases, presence of strangulation, and bowel resection. Risk factors for morbidities were type of hernia, presence of co-morbid diseases, and bowel resection. Duration of presentation has been classically correlated well with morbidity and mortality in this clinical entity. Andrews made a conclusion that a long duration of irreducibility (or a delay in the presentation of a groin hernia) significantly affected viability of contents.[14] However, in our study, duration of presentation has not been found as significant factor for morbidity or mortality. This may have been because of above patient factors: patients may be walking and living happily with these irreducible hernias and then they bothered to present to the hospital after many years. An important factor for undesirable outcomes of the patients with complicated hernias is advanced age. Six out of 7 patients who died in our series are above 60 years of age. The physiologic reserve of the elderly patient is ultimately affected by the aging process and by concomitant diseases.[25] In Takuev et al study also, 12 of their 13 patients died were older than 60.[28] Oishi and associates also observed that all the mortalities were recorded in patients older than 68.[26] Management of incarcerated external hernias is certainly not free from mortality. A total mortality of 11.11% was found for complicated hernias in the present study. Andrews found a mortality of 37% for complicated groin hernias.[14] McEntee and colleagues recorded an overall mortality of 10.4% and postoperative complications 19.6%.[16] Nesterenko noted an 13.4% mortality.[23] All except one of our patients had bowel resection due to strangulation and

gangrene. Most of the older age group patients in whom complicated hernias are common are found to have an associated medical illness. Mortality was influenced by coexisting diseases and the viability of the hernia contents. This was consistent with a study by Dunphy, who suggested that old age with its associated medical problems was a major factor for the high death rate in complicated hernia.[27]

Conclusion

We conclude that the scenario in our context is quite different from past researches from other countries in many respects, including the duration of presentation and the types of hernia presenting with complications. The bitter fact is in the 21st century; we still walk and live with hernias rather than cure them. Awareness campaigns may have to be started to decrease its burden like what has been done for infectious diseases in our regions. The mortality rate after repair of complicated external hernias continues to be associated with advanced age and serious coexisting diseases. Elderly males have a higher propensity for developing complications in hernia, and those who have co-morbid diseases with inguinal hernia and with strangulation and needing bowel resection are most likely to die from more complications. Such patients when seen in the outpatient department should be given priority admission and taken up for early elective surgery.

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