

Anthropology of Inguinal Hernia

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ABSTRACT

Introduction: Inguinal hernias are among the most common surgical problems worldwide. Hernias, defined as the protrusion of a whole or part of an organ through the containing wall, along with difficult childbirth and problematic bowel evacuation are thought to be the price we pay for adopting the bipedal gait from previously crawling on all fours. The aim of this study was to analyse the anthropological characteristics of patients with inguinal hernias, so as to determine the influence of behavior, evolutionary development and flawed physiology of their pathogenesis, and thereby identify potential domains for risk reduction.

Material and Methods: This was a non-interventional, retrospective study. 100 consecutive patients electively operated for inguinal hernias were included and their clinical profiles studied. The details of their demography and presentation were tabulated and analyzed.

Results: Inguinal hernia had an overwhelmingly male preponderance, with 99% of patients being male. The mean age of patients at presentation was 56.5±13.27 years. In 93% of patients the condition was unilateral, where as it was bilateral in 7%. Right sided hernia was more common with 49% of cases, left side was involved in 44%. 49% were found to be direct hernias, 36% were indirect and 8% were pantaloon hernias, with the remainder being bilateral hernias. Right sided direct hernias were the most commonly encountered, accounting for 28% of the cases, followed by left indirect hernias which were seen in 24%.

Conclusions: The epidemiological profile of inguinal hernias in the study population translate to statistically significant findings with respect to demographic features and risk factors for inguinal hernias, well elucidating the anthropology of the condition. This study showed statistically significant association between inguinal hernia and high BMI, older age and positive family history, rather than the conventional suggestion that increased intra-abdominal pressure is the major risk factor. Thus, the role of anthropology and physiography in the development of inguinal hernias cannot be overlooked.

Keywords: Inguinal Hernia, Epidemiology, Demography, Anthropology, Risk Factors

INTRODUCTION

A hernia is the protrusion of the whole or part of an organ through the wall that contains it. Anterior abdominal wall hernias are broadly classified as groin hernias and ventral hernias based on their location. Often ignored as they may remain asymptomatic for prolonged periods, the severity of the condition is oft overlooked, with a resultant mortality as high as 7% in acute surgeries.¹ Though present across genders, age groups and racio-ethnic groups, inguinal hernias tend to be more common in men, with an increasing incidence with age.²

Over 1 million surgeries are performed per year in the United States of America (which has a total population of less than 350 million) and over 100,000 surgeries performed every year in the United Kingdom³ (of a population of around 66 million).

The exact figure for India is unavailable, but with the average global incidence of hernia surgery being 3 per 1000 population yearly⁴, and extrapolation of the global data, India with a population of 1.36 billion would likely be home to over 2 million hernia surgeries every year.

Groin hernias account for over 3/4th of all abdominal wall hernias, and with a life-time risk of developing inguinal hernias being over 25% in men, indicating that one quarter of all men face the odds of developing an abdominal hernia.⁵ Primary inguinal hernias are most commonly of the indirect variety, whereas recurrent hernias tend to be of the direct kind.⁶ Late testicular descent and more frequent failure of closure of the processes vaginalis on the right side may account for the right-sided prevalence of inguinal hernias.⁷ Inguinal hernias are common in males (7:1 ratio) whereas ventral/umbilical hernias predominate in women⁸ likely representing socio-biological outcomes.

The aim of this study was to analyse the anthropological characteristics of patients with inguinal hernias, so as to determine the influence of behavior, evolutionary development and flawed physiology of their pathogenesis, and thereby identify potential domains for risk reduction.

MATERIAL AND METHODS

This was a retrospective observational study done in the Surgical Department of a tertiary care hospital in Bangalore, South India.

The aim of the study was to analyse data of 100 consecutive patients operated for primary inguinal hernias and the target sample was achieved in 6 months.

Relevant history, demographic facts, clinical data and examination findings were noted.

Inclusion Criteria

- Adult patients (>18 years) operated for inguinal hernias for the first time
- Only primary hernias were considered
- Uncomplicated hernias

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- Only elective cases were considered
- Both male and female patients were considered

Exclusion Criteria

- patients below 18 years of age
- Emergency surgeries
- Complicated hernias
- recurrent hernias
- Patients being simultaneously operated for coexisting conditions including ventral hernias were excluded
- Patients previously operated for contralateral inguinal hernia
- History of surgery for any groin or ventral hernia in the past

It was a non-interventional study without any follow-up as outcome of surgery was not a parameter of assessment. Methodology employed was purely data collection from patient records and operation theatre logs. All relevant data was tabulated and analysed. Statistical methods were used in data analysis, yielding quantitative results.

RESULTS

100 patients were enrolled in the study, mean age was 56.5±13.27 years, and the majority (43%) of patients belonged to the 40-60 years' cohort (64 %). Increasing incidence with age was the trend noted (Table 1). Of the 100 patients, 99 were male and only one patient was female (Figure 1).

Age in years	Number of Patients	Percentage (%)
21-30	1	14 %
31-40	13	
41-50	19	64 %
51-60	45	
61-70	16	
71-80	6	22 %
Total	100	
Mean ± SD	56.5 ± 13.27	

Table-1: Age distribution of patients in the study

Side	Number of Patients	Percentage (%)
Unilateral	Right	49 %
	Left	44 %
Bilateral	7	07 %
Total	100	100%

Table-2: Side distribution of hernias in patients in the study

Duration of symptoms	Number of Patients	Percentage (%)
0-1 month	29	29 %
1-3 months	21	21 %
3-6 months	30	30 %
6-12 months	13	13 %
>12 months	7	7 %
Mean duration	5.02±8.19 months	

Table-3: Duration of Symptoms in patients in the study

Right sided hernias were seen in a total of 49 patients, left sided hernias were seen in 44 patients and 7 patients had bilateral hernias (Table 2).

Mean duration of symptoms in Group A was 5.02±8.19 months (Table 3).

Of the 100 hernias in the study, 49 were direct hernias, 36 were indirect and 8 were found to be pantaloon hernias (Table 4).

Most common comorbidity encountered was hypertension, seen in 6 % of the patients. 5% were chronic smokers (Table 5).

75% of patients were either overweight or obese, with majority of patients (67%) falling in the overweight category (Table 6).

Weakness of abdominal wall was the most common risk factor present. 75% of patients were over-weight or obese

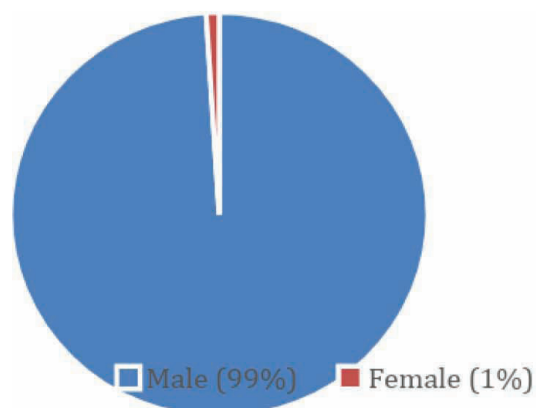


Figure-1: Sex Distribution

Type of Hernia	Number of Patients	Percentage (%)
Right direct	28	28 %
Right indirect	12	12 %
Right pantaloon	6	6 %
Left direct	21	21 %
Left indirect	24	24 %
Left pantaloon	2	2 %
Bilateral Hernia	7	7 %
Total	100	100 %

Table-4: Types of Hernias Encountered

Comorbid condition	Number of Patients	Percentage (%)
Hypertension	6	6 %
Alcoholism	6	6 %
Diabetes Mellitus	5	5 %
Smoking	5	5 %
Ischemic Heart Disease	1	1 %

Table-5: Comorbidities in patients in the study

BMI	Number of patients	Percentage (%)
>30	8	8 %
25-29.0	67	67 %
20-24.9	24	24 %
<19.9	1	1 %

Table-6: Distribution of patients according to BMI

Risk Factor		Number of Patients	Percentage (%)
Increased Intra-abdominal Pressure	Prostatism	13	13 %
	Chronic Cough	8	8 %
	Constipation	6	6 %
	Weight Lifting	7	7 %
Weakness of Abdominal Wall	Obesity/Overweight	67	67 %
	Old Age (>50 years)	65	65 %
	Previous Abdominal Surgery (Other than Hernia repair)	7	7 %
	Pregnancy	1	1 %
	Smoking	5	5 %
Other	Family History	39	39 %
	Connective Tissue Diseases	0	0 %

Table-7: Distribution of patients according to risk factors present

(BMI >25) and 65% were above 50 years of age (Table 7).

DISCUSSION

The global burden of inguinal hernias is immense, with the lifetime risk being a staggering 27% in men, and 3% in women⁹, thus 1 in 4 men has the risk of developing the condition. It is no surprise that inguinal hernia is the most common indication for elective abdominal surgery in adults and the prevalence in the pediatric population is not low either. Worldwide, the estimated annual incidence is over 20 million cases. Around 2 million hernia surgeries are performed in India alone annually – the numbers unfathomable.

Inguinal hernias are classified as direct or indirect based on their pathogenesis. Direct hernias occur when the abdominal contents protrude through the posterior wall of the inguinal canal, whereas in the case of indirect hernias, the protrusion occurs through the deep inguinal ring.¹⁰ Early on, the hernias are usually asymptomatic, manifest as a swelling that appears on straining and disappears at rest; however, with time they grow in size, and become associated with pain and discomfort. The pain is typically described as “dragging type” as is highly characteristic. Hernias initially can be manually reduced, but eventually become irreducible, and this can then progress to strangulation, obstruction or incarceration, with vascular compromise to the involved viscera, warranting emergency surgery.¹⁰

Surgery remains the only definitive method of treatment, and strengthening of the posterior wall of the inguinal canal using an extrinsic mesh is widely accepted as the best way of achieving repair. The tension-free mesh repair hernioplasty proposed by Lichtenstein¹¹ has become the universally accepted gold standard for open hernia repair, because of its simplicity, reproducibility and the reduced rates of recurrences.¹²

Despite the huge burden of the disease, the pathogenesis is not completely characterized, and multiple theories have been proposed for their development, as well as for innate protective mechanisms against their development – none without unequivocal certainty however. The demographic, epidemiological and anthropological data of 100 patients

operated for primary inguinal hernias who satisfied the inclusion criteria (aimed at eliminating confounding variables) were studied to determine the role they played in the pathogenesis of inguinal hernias. The mean age of patients at presentation was 56. ±13.27 years (Table 1). This is comparable to other studies.¹³ There appears to be a bimodal peak in the incidence, with pediatric population and the elderly being most commonly involved, however the etiopathogenesis is different in the two groups. In our study, the most common age group involved was the 40-60 years' category. The 40-60 years' group has similarly been reported as the most involved in other studies.^{10,14} Inguinal hernia had an overwhelmingly male preponderance, with 99% of patients being male (figure 1). The male preponderance in literature is also reported to be 90-96%.^{10,15} Defects caused in the abdominal musculature and supporting tissues by testicular descent during embryological development is considered the chief reason that the male preponderance is dramatically higher.¹⁵

In 93% of patients the condition was unilateral, where as it was bilateral in 7%. Overall, right sided hernias were more common, seen in 49% of the patients, while left sided hernias were present in 44% of patients, and the remaining patients presenting with bilateral hernias (Table 2). Similar trend was reported by Testini et al.¹⁵ Duration of symptoms at presentation in our study was 5.02±8.19 months (Table 3). This correlated with other studies.¹⁴

Of the 100 hernias in the study, 49 were direct hernias, 36 were indirect and 15 were found to be pantaloon hernias (Table 4). The distribution of direct and indirect hernias was also compared and the present study correlated well with Testini et al.¹⁵ Right sided direct hernias were the most commonly encountered, accounting for 28% of the cases, followed by left indirect hernias which were seen in 24%. This could however be due to the fact that majority of the population belonged to older age distribution, and older age itself is a known factor in the development of direct hernias. The prevalence of right-sided hernias is attributed to later descent of the right testes during embryological development, and more frequent failure of closure of the

processes vaginalis on the right side, and most studies show a 60-70% preponderance for right-sided inguinal hernias.¹⁰ The most commonly encountered comorbidity was hypertension which was seen in 6% of patients (Table 5). Statistical significance could not be elucidated from the comorbidities encountered. 75% of patients were either overweight or obese, with majority of patients (67%) falling in the overweight category (Table 6), thus indicating the weakness of the abdominal wall brought about by its stretching and the resultant laxity provides the abdominal viscera the opportunity to escape their high-pressure compartment. Literature in this regard is mixed, with reports indicating that obesity is both a risk factor as well as protective factor. Zendejas et al¹⁶ reported highest incidence amongst overweight population and least in the obese.

The pathogenesis of hernias has been explained by numerous theories, including failure of innate protective mechanisms. Causation has been linked to elevated intra-abdominal pressure as a consequence of chronic cough, constipation, prostatism, lifting heavy weights and weakness of abdominal musculature due to obesity, multiparity, previous abdominal surgeries such as appendectomy and age-related muscle degeneration.¹⁰ Being overweight (67%), older age (65%) and positive family history (39%) were the most common risk factors present in our study population (Table 7). This is in contradiction to literature that states that medical conditions such as benign prostatic hyperplasia (BPH) (37.9%), chronic obstructive pulmonary disease (COPD) (18.5%) and chronic constipation (13.6%) by virtue of elevated intra-abdominal pressure are the most important risk-factors.¹⁶ Additionally, a relatively reduced influence of body weight (21.2%), older age (24.8%) and family history (15.6%) has been reported in contrast to our findings.^{10,16} Smoking was established as an independent risk factor for hernia development with Malviya et al reporting 30.6%¹⁰ of their study population having the risk factor. In our study only 5% of the individuals were smokers (Table 5). Literature is divided regarding the influence of obesity and smoking on hernia development, with contrasting reports published with regard to their deleterious and protective effects.¹⁰ In our study too, while being over-weight (BMI 25 – 29.9) was a definitive risk, and being obese (BMI >30) did not correlate with increased risk. Family history however appears to be an independent risk factor in the etiopathogenesis.^{10,15,16}, and was reiterated by the findings in our cohort.

Direct hernias were most commonly found to be associated with weakness of the abdominal wall, being associated with obesity, older and and family history. Of the 49 patients with direct hernias, 39 patients had BMI more than 25 (nearly 80% of the cases) and 31 were above 50 years of age. 28 patients had positive family history. On the other hand, indirect hernias did not show such strong affinity to risk factors, but most (65%) patients who gave history suggestive of prostatism or chronic obstructive pulmonary disease had indirect hernias, correlating to findings of other studies^{10,15}, and highlighting the difference in the pathogenesis of direct and indirect inguinal hernias.

CONCLUSION

Despite their prevalence and the myriad of procedures developed to repair them, the definitive factor in the etiology of inguinal hernias remains to be elucidated, with no single factor that can be implicated. This multi-factorial basis, along with their variations with regard to the pathology of direct and indirect hernia suggest further influences, which the study of the epidemiology, demography and anthropology aimed to enumerate. Abdominal wall weakness rather than elevated intra-abdominal pressure was found to be the more commonly associated risk factor, and previously established risk factors such as smoking did not significantly correlate to definitive risk in this study population, suggesting that geographical variation may constitute an undefined influence on disease development and progression. This would be better studied with multi-centric meta-analysis of *physiographically*-defined cohort populations with the elimination of the influence of possible confounding factors.

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