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Inguinal hernia in a rural population of Haryana: A surgical public health interface

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Abstract

Hernia is one of the most common surgical procedures carried out by all general surgeons. A retrospective study was done at our hospital to analyse the incidence of abdominal wall hernias from patients coming from a rural population in India. Further, a scrutiny was also done to elucidate the causative factors especially the effect of environmental pollution.

Majority of the patients seen in this study were more than 55 years of age. The male to female ratio was 7.33:1. Out a total 200 cases, inguinal hernias were present in about 73% cases. Ventral hernias were present in about 23% of cases. Femoral hernia were present in 1% of cases and the incidence of groin hernia was almost the same as observed globally despite differences in educational status and life style; Ventral hernia and direct hernia incidence was much more common in our study when compared to Western studies. This may be because of their variation in the life style, occupation and impact of environmental pollution. A number of operating brick kilns were also present and functional in the study area. However, this high incidence of ventral and direct hernia was consistent with the findings of other studies of rural Haryana.

Keywords: Direct Inguinal hernia, Ventral hernia, Occupation. Environmental Pollution, Brick Kilns

Introduction and Review of Literature

Abdominal wall hernia is commonest surgery done globally. During one year of our surgical practice at our hospital (WCMSRH), we noticed a very high incidence of ventral and direct hernias in our Surgical Department. In view of agricultural based rural population and large no of brick kilns operating in this area affecting the majority of population, we sought to establish the epidemiology and compare globally the incidence of various hernias in our study. There are limited number of studies related to this subject hence we decided to conduct a retrospective study and establish the results.

Evidence of hernias can be traced back to civilizations of ancient Egypt and Greece[(1)] Abdominal wall hernias were frequently encountered in surgical practice and account for 15-18% of all surgical procedures.[(2,3)] Globally more than 20 million hernia surgeries are performed every year.[(4)] Of the total prevalence of inguinal hernia, majority of abdominal wall hernias occur in groin (75%).[(5)] As reported in literature the sex ratio among inguinal hernias is 9:1. Prevalence of inguinal hernia increases with age; 12% of cases were noted in age group of 25-34 while 34% of cases were noted above the 75 years age group.[(5)] Further, femoral hernias were four times more common in females.[(6)] Inguinal hernias are more common on right side; on the other hand indirect hernias are twice as common as direct hernias. Incidence of recurrence of these hernia was less than 1% with Linchensteins repair.[(6)] Incisional hernias are more common in males[(7)] mid line ventral hernias are the next common variety of abdominal wall hernias. According to location of hernias, these are further classified into umbilical, para-umbilical and epigastric hernias; other varieties like obturator and traumatic are very rare.

A number of Indian studies have observed that two thirds of abdominal wall hernias were in the age group of 30 to 69 years. The male: female ratio observed in these studies was 7:1.[(8)]

About 78% of abdominal wall hernias were groin hernias and the most common complication noted was seroma formation followed by wound infection which were seen in less than 5 per cent of cases.[(8)]

Very few Indian studies have commented and have explored the causative factors of these hernias especially related to respiratory disorders such as COPD or environmental factors. However, one study has reported bilateral direct inguinal hernias and a left femoral hernia in a 65 year old woman suffering from COPD.[(19)]

The role of environmental pollution especially in females and children who generally do not give a history of smoking needs further careful scrutiny and exploration. In this study, we tried to examine the prevalence of abdominal hernias and whether environmental pollution played any role in its pathogenesis and sustenance or recurrence.

Epidemiology of Hernia

One of the common problems encountered during hernia surgery is recurrence. It has been reported that about 13% of hernia repair recur.[(13)] The reason for this may be unclear; so in our study we studied the role of epidemiological and patient factors on the genesis of abdominal hernias in this retrospective study.

Studies have shown that the lifetime risk of developing an inguinal hernia was 3% for women and 27% for men. Inguinal hernia was more common on the

right side and indirect hernias was twice as common than direct hernias. In an earlier evidence based study conducted to elucidate the risk factors for hernia, the risk factors identified were chronic obstructive pulmonary disease, cigarette smoking, low body-mass index, collagen diseases and genetic susceptibility.[14,17,18] The chances to get an inguinal hernia are higher when there is a positive family history.[15,16]

There are reports that collagen vascular diseases also predispose to hernias. In Denmark, about 10,000 and 3,000 patients are operated on an annual basis for inguinal hernias.[20] Various studies have shown that thinner collagen fibrils of the anterior rectus sheath have been seen in patients with inguinal hernias.[21] Collagen which is formed from fibroblasts plays an important role in the formation of fibrils. Collagen metabolism is altered in both inguinal and incisional hernia patients; especially the sero-markers markers for type IV collagen turnover which can be used to predict the development of hernias.[22]

Genetic susceptibility also predisposes to hernia as reported by a study; which identified four susceptibility loci in the regions of EFEMP1(EGF Containing Fibulin Like Extracellular Matrix Protein 1), WT1, (Wilms tumor protein 1), EBF2 (early B cell Factor 2 which determines brown versus white fat identity) and ADAMTS6 (ADAM metallopeptidase with thrombospondin type 1 motif 6). This study which was conducted in California was a large-scale genome-wide association study (GWAS) of surgically confirmed inguinal hernia was done. EFEMP1 loci is a member of the fibulin gene family, and the this protein binds tropo-elastin which is the building block of the elastin protein [23] These genes play an important role in connective tissue maintenance and homoeostasis and aberrations can predispose patients to inguinal hernia.

In our study, we therefore sought to find out any role of environmental factors which could lead to the development of chronic obstructive pulmonary disease besides cigarette smoking. As reported by most of the patients enlisted in our study, they reported a high prevalence of respiratory disorders in children and women in the area who did not give any history of smoking or eating gutka or using hookah.

Objectives of the Study

1. To find out various types of Hernias present in this rural area of Haryana in a specified time period
2. To elucidate the socio-demographic profile of the patients having Hernia
3. The find out the patient factors associated with the development of hernias in this region and find out if any environmental factor(s) contributed to the pathogenesis of Hernia
4. To formulate recommendations based on the above findings, so as to prevent and decrease the prevalence of hernias in this area

Materials and Method

A retrospective study of 200 cases of abdominal wall hernias was conducted of patients who were operated at World College of Medical Sciences and Research and Hospital, Gurawar, Jhajjar, Haryana, from March 2016 to February 2017. The data was collected from their case-sheets available in hospital. The data was compiled and analysed.

Observations and Results

Type of hernia, socio-demographic profile and co-morbid conditions: Over a period of one year, 200 cases of abdominal wall hernias were operated at WCMSRH which constituted 30.58% of the operative workload of the general surgery department. Age varied from one and a half years to 88 years with an increasing incidence with age (Table 1).

Table 1: Age distribution

Age group (in years)	No. of patients	% of total patients
1 - 10	16	8.00
11 - 20	04	2.00
21 - 30	22	11.00
31 - 40	32	16.00
41 - 50	34	17.00
51 years and beyond	92	46.00
Total	200	

Table 2: Sex distribution

Age group	Male	Female
1-10	16	0
11-20	4	0
21-30	22	0
31-40	26	6
41-50	28	6
51 and above	80	12
Total	176	24
Ratio	7.33	1

Table 3: Type of Hernias

S No	Type of Hernia	Total cases (200)	Percentage
1	Inguinal Hernias	146	73
2	Right Inguinal Hernia (Direct)	36	18
3	Right Inguinal Hernia (Indirect)	44	22
4	Left Inguinal Hernia (Direct)	22	11
5	Left Inguinal Hernia (Indirect)	26	13
6	Bilateral Inguinal Hernia (Direct)	10	5
7	Recurrent Inguinal	8	4

	Hernias		
8	Para Umbilical and Umbilical Hernias	36	18
9	Epigastric Hernias	10	5
10	Incisional Hernias	6	3
11	Femoral Hernias	2	1
	Total	200	

The incidence of inguinal and incisional hernias was low in our study as compared to other countries carried out in USA and UK[8] but ventral hernias and direct inguinal hernia showed an opposite trend in our study (Table 4).

Table 4: Prevalence of abdominal wall hernias in various countries compared with this present study (values are given in percentages)

Types of hernia	USA	UK	Pakistan	Present study
Inguinal	88	82.05	76.35	73
Para-umbilical	3		12.38	18
Umbilical			3.95	
Incisional	10	6.05	2.70	3.00
Epigastric				5

Table 5: Comorbid illnesses associated with Hernia in this study

S No	Diseases	No. of patients	% of total patients
1	Respiratory diseases	26	13.00
2	Diabetes mellitus	06	3.00
3	Hypertension	18	9.00
4	BHP and Prostatitis	20	10.00

As seen in the above table, respiratory diseases were the most common comorbid condition associated illness followed by BHP.

Table 6: Postoperative complications

S No	Complication	No. of patients	% of total patients
1	Wound infection	2	1
2	Seroma	4	2
3	Hematoma	0	0
4	Pyrexia	2	1

Table 7: Prevalence of hernia according to occupation

S No	Occupation	Patients
1	Farmers	140
2	Brick kiln workers	60
		200

Observations regarding brick kilns: We also observed a high number of hernias in brick kilns workers in this area. These brick kilns were emitting high amounts of smoke dust and SPM and were without filters. The photographs shown were taken concomitantly during the time period of the study period. However these have been in operation in this area for the last 10-15 years.

The stepwise operative steps of hernia repair

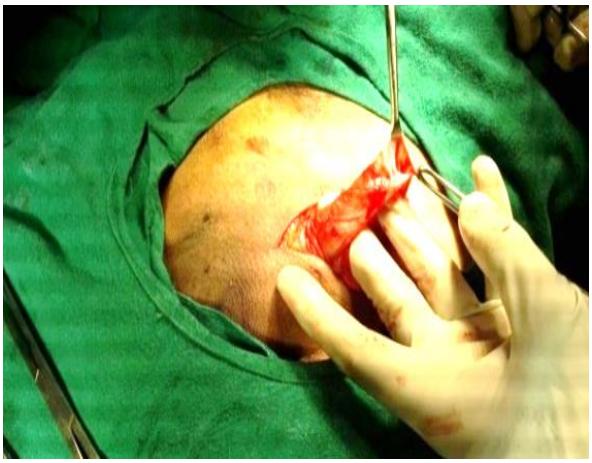


Fig. 1: Identification and opening of hernia sac

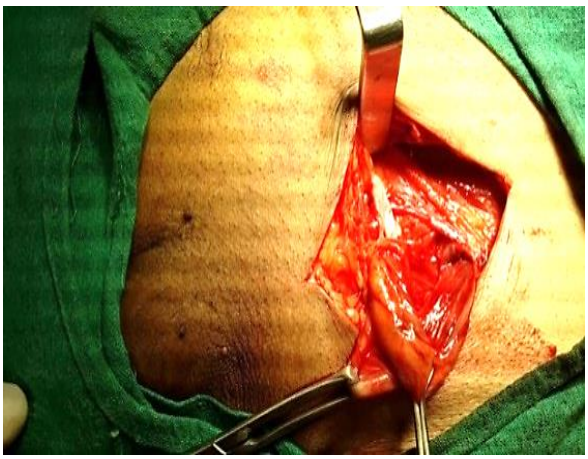


Fig. 2: Posterior wall repair

Fig. 3: Closure of skin incisions

Discussion

Being a commonly performed surgical operation, abdominal hernias comprise a significant proportion of total surgical work load in most of the hospitals in surgical centers. Although it has been reported to constitute 15% -18% of total surgical operations but a higher prevalence of 30.5% in present study may be due most patients coming from a rural based residence and predominantly doing agriculture as their main profession with exposure to environmental pollution due to the presence of brick- kilns in the vicinity as shown above or smoking and respiratory diseases.

This study was done in rural population where main profession is agriculture and is surrounded by lot of brick- kilns, so the people in this area were exposed to heavy work and pollution arising from smoke of brick – kilns resulting in possible increase in respiratory diseases. Age and prostate disorders (in males) were the other associated factors. In this study, inguinal hernias constituted 73% of total abdominal wall hernias; Inguinal hernia were twice more common on the right side (possibly due to the embryonic late descent of the right testis) but in our study the ratio observed was 1.75:1 The incidence of indirect and direct hernia were 1.2:1. Indirect hernia was more common in younger age group and direct hernia was more common in older age group. The higher incidence of direct and ventral hernias in present study may be due to heavy work, pollution, age and prostate related disorders.

Males outnumbered females by a ratio of 7.33:1 which is more as compared to 5:1 of studies conducted in the USA.[(11)] This may be due to the fact that males are more involved in strenuous work and exercise in agriculture as compared to females who are predominantly involved in household work. This trend holds true for all abdominal wall hernias except para-umbilical and epigastric hernias where females show are more involved. In females, para-umbilical hernia was the commonest type of hernia found followed by epigastric and umbilical hernias. Some studies have however reported the contrary where umbilical hernia followed by incisional hernia.[(12)]

Incisional hernia was noticed in approximately 3% of the cases which is significantly lower than studies conducted in other countries such as USA and UK where it has been reported to be in the range of 6% - 10% of all cases. Our study showed similar results to other studies which have reported on the causative factors such as presence of respiratory disease to be of 13% followed by prostatic disorders in 10 per cent of patients, hypertension in 9 per cent and Diabetes mellitus in 3 per cent.[8,9]

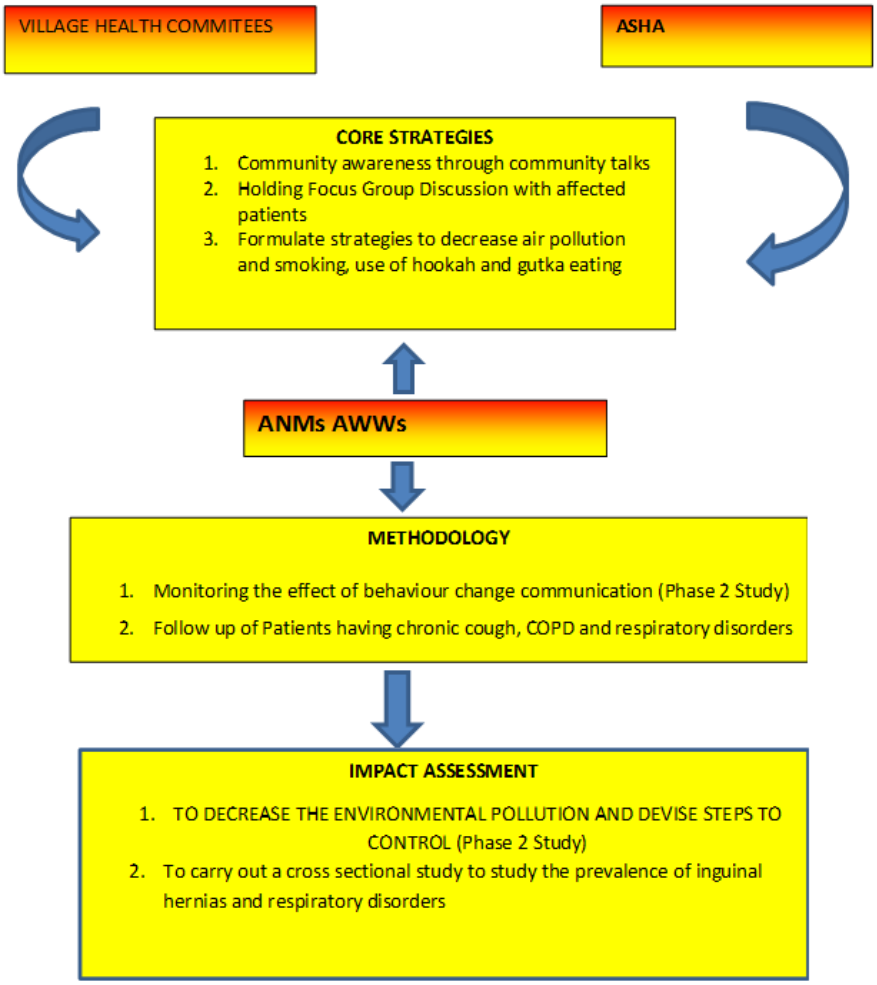
In the past decade, the complication rates of abdominal wall hernia surgery have drastically come down with the advent and the use of prosthetic mesh. No recurrence has been reported till date in our study. The observed complication rate of approximately 4% was noticed in our study; however compared to some other studies this was observed to be in the range of 4% - 12%.[10] In our study only 2 per cent cases were operated in emergency.

With the advent of better technology, improved quality of care complications like irreducibility, obstruction and strangulation are decreasing reflecting better quality of care, increasing awareness of population and overall management.

Conclusions and Recommendations

The relevance of tracking with community awareness and improved health seeking behaviour has already been established as evidence based interventions to prevent diseases from occurring in a community. Behavior Change Communication (BCC) has been shown to be successful in India in HIV/AIDS prevention carried out in operation lighthouse by USAID.[19] Changing behaviour and health seeking norms may not be easy but with the success of Balbir Pasha show shown in Mumbai; this may be possible if the community fully comprehends the negative consequences of a habit and if they are motivated to change.[20,21]

Table 8: Algorithm for increasing awareness bcc and tracking in prevention of inguinal hernias through empowerment of village health committees and Asha



We therefore sought to carry out a BCC with the help of Village Health Committees. An algorithm of community intervention was formed as a second part of this study (See Table 8) and we sought to first improve health awareness regarding this disease. This part of our study which is ongoing is sought first to assess the community perception with FGDs and then to implement BCC and Community talks as main tools to seek a change in the health bahavior followed up with a cross sectional study for impact assessment.

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