Research Letter

Risk Factors of Inguinal Hernia in Urban South Africa

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Abstract:

Background:

One million inguinal hernia repairs are performed annually in the USA. Although there are reports on the prevalence of inguinal hernias from sub-Sahara Africa, similar reports and guidelines are lacking for the South African population. The aim of this study was to address the epidemiology of inguinal hernias in a South African population.

Methods:

A retrospective review of all adult patients admitted with inguinal hernias to a public health facility in Johannesburg, was performed using a retrospective review of hospital patient records from August 2019 to May 2020. The patient records were analysed to identify the risk factors associated with inguinal hernias in this population.

Results:

Of the 125 patients, 91 were male (73%, mean age 50) and 34 were female (27%, mean age 47). Eighty-seven patients self-identified as Black African, 31 as White, four as Indian and three as mixed race. The right side predominated. Twenty patients had bilateral hernias. The mean BMI of males was 25, and 29 for females (p=0.002). Seventy-five patients were never-smokers, seven patients suffered from chronic obstructive pulmonary disease, and six had a family history of hernia. Fifteen patients indicated lifting heavy weights.

Conclusion:

Based on the study population, women had a nine-fold higher risk for developing an inguinal hernia, compared with women in Western countries. Further studies of inguinal hernia in women on the African continent are strongly advised.

Keywords: inguinal hernia, risk factors, urban South Africa

INTRODUCTION

The first record of an inguinal hernia was found in the Ebers papyrus (1) in Egypt dated 1552 BC. More than 3 000 years later, the diagnosis appeared in the writings of Casper Stromayer (1559) as documented in a French monograph by Lorenz Heister in 1724.(2) This 16th century European physician also described two types of inguinal hernia, namely the lateral or indirect and the medial direct as well as the surgical approach to each. The incidence of inguinal hernia has increased at an exponential rate and approximately a million inguinal hernia repairs are performed annually in the USA.(3)

In well-resourced Western countries the relative risk of developing an inguinal hernia is estimated at 27% for men and 3% for women.(4) In European settings, the risk factors associated with inguinal hernia development are divided into patient factors (e.g. age and sex) and external factors (e.g. heavy lifting or strenuous physical activity). Patient risk factors include male gender, old age, patent processus vaginalis, connective tissue disorder and low BMI.(5) In contrast, there is scant data on the risks factors predisposing to the development of inguinal hernias in sub-Saharan populations.(6) Thus, the aim of this study was to explore these risk factors in patients with established inguinal hernia in an urban, adult South African population.

METHODS

This was a retrospective analysis of consecutive patient records of all patients admitted to Edenvale hospital, a regional public hospital in Johannesburg, with an inguinal hernia from August 2019 to May 2020. Patient demographics which included age, gender, ethnicity, family history of a hernia, BMI, lifestyle and comorbidities were recorded and statistically analysed. The

Table 1: Detailed summary of study results

Variable	Results
Inguinal hernias enrolled and data analysed:	125 (67.57%) 95% confidence interval of 60.3%–74.3%
Hernia sidedness	73 (58.4%) Right sided inguinal hernia 32 (25.6%) Left sided inguinal hernia 20 (16%) Bilateral inguinal hernias
Gender	91 (72.8%) Male 34 (27.7%) Female
Citizenship	89 (71.2%) South African citizens 36 (28.8%) foreign nationals
Age	Mean age overall: 50 years (SD ± 16.03) Mean age for males: 50.74 (SD ± 15.43) Mean age for females: 46.67 (SD ± 17.45).
Race	87 (69.6%) Black African 31 (24.8%) White 3 (2.4%) Mixed Race (Coloured) 4 (3.2%) Indian
Race and age	Black: 47 years (35–56) *vs* "Other" 59 years (45–70), p=0.003
Employment	63 (52.50%) currently unemployed 57 (47.5%) currently employed (formally or informally)
Occupational type	10 (17.54%) no effort or sedentary work (e.g. night watchman, office worker) 32 (56.14%) light effort (standing work involving occasional lifting of not-too-heavy weights (e.g. waiter, shop assistant, electrician, domestic worker)) 10 (17.54%) medium effort (more frequent lifting (e.g. agricultural and construction workers, domestic worker, cleaner)) 5 (8.77%) high daily effort (e.g. quarry workers, manual warehouse workers)
BMI	Mean BMI for all 125 patients: 26.19 ± 4.62 with 58 (46.6%) of these patients with a BMI of less than 25. Mean BMI for males 25.2 (SD ± 4.3) Mean BMI for females 28.5 (SD ± 4.7) Males have a significantly lower median (IQR) BMI compared to females at 24 (23–29) *versus* 29 (24–32), p=0.002
Lifestyle Characteristics	17 (14.41%) regular lifting of heavy items (>20kg), >3 days per week 26 (22.02%) regular physical exertion/gym, >3 days per week 75 (63.56%) no physical activity
Smoking cigarettes	75 (62.5%) never smoked nicotine cigarettes 19 (15.85%) smoked nicotine cigarettes previously but not currently 26 (21.67%) currently smoke nicotine cigarettes

data collection was done utilising a pre-existing hospital patient database. Inclusion criteria were all patients with primary and recurrent inguinal hernias. Male and female patients over the age of 18 years, patients able to sign consent and give a detailed history regarding their hernia, or any patient who had an escort/guardian present who could give accurate and reliable information were included in the study. Exclusion criteria included incomplete data regarding risk factors in patients with inguinal hernias.

Ethics clearance for this study was obtained from the University of the Witwatersrand Human Research Ethics Committee.

RESULTS

A total of 125 patients, with complete data, were admitted to hospital with inguinal hernias; 91 were male (73.8%, mean age 50 years) and 34 were female (27.7%, mean age 47 years). (TABLE 1) Right sided hernia was predominant with 73 patients having right inguinal hernias, 32 left inguinal hernias and 20 patients had bilateral hernias. Eighty-seven patients self-identified as Black Africans, 31 as White, four as Indian and three as mixed race. The mean age of Black African patients was 47 (35–56 years) compared to 59 (45–70 years) in the other racial groups, (p=0.003). The mean BMI for males was 25.2 (IQR 23–29) and 28.5 for females (IQR 24–32), p=0.002.

Seventy-five patients were never-smokers, while the remainder were past or current smokers. Seven patients had a history of Chronic Obstructive Pulmonary Disease (COPD), six suffered prostatomegaly and six patients had a family history of inguinal hernia.

DISCUSSION

In this study, the finding that inguinal hernia was more common in men was expected; delayed obliteration of the processus vaginalis and the preferential employment of men in occupations requiring heavy lifting are well known risk factors.(7) An increased incidence of inguinal hernia was noted among the manual labourers of Sierra Leone (8) as well as farm and construction workers of Ghana,(9) Egypt (10) and India.(11)

Six patients in the current study had a family history of inguinal hernia. This finding has also been recorded in Nigeria,(12) and is likely to be a defect in collagen production similar to those who inherited connective tissue disorders described in Western countries.(13)

In the current study 36% of patients with inguinal hernia were either current or previous smokers. Cigarette smoking is rapidly increasing in Africa due to aggressive marketing of the tobacco industry.(14) Öberg and co-workers found that in cigarette smokers there is increased collagen degeneration and increased synthesis in human fibroblasts, which may be linked to an increased risk of inguinal hernia. (13) Taking into account that 20% of South African adults were admitted to hospital for diseases related to smoking in 2022, smoking may be contributing increasingly to the aetiology of inguinal hernias in South Africa.(15)

Risk factors for development of inguinal hernia in men of sub-Saharan Africa appear very similar to those reported from Western countries. An unexpected finding in this study was the high proportion (27%) of women with an inguinal hernia. This is greater than the reported prevalence of 3% in Swedish, British and American women.(16–18) Of interest is a series of patients with inguinal hernias in a semi urban population in India, which reported a prevalence of 20% in women.(19) Lifting heavy objects and improper bowel movements were the major risk factors in this study.

Two risk factors may be associated with the finding of a higher prevalence of inguinal hernia in women in the current study. In general, 60% of South African woman are either overweight (BMI>25) or obese (BMI>30).(20) In the current study, the mean BMI (28.5; SD±4.7) of females with a hernia was significantly greater than that of males (25.2; SD ± 4.3). In addition, women in South Africa are commonly employed in domestic work, which entails prolonged standing, manual labour and often heavy lifting (such as furniture and children).

Study Limitations:

The data collection site (Edenvale regional hospital) only sees American Society of Anaesthesiologists (ASA) classification 1 and 2 patients. Therefore, inclusion bias may be present as some patients had no history of comorbidities. Patients with comorbidities are commonly seen at tertiary and quaternary facilities. This dataset, therefore, may not be representative of the greater population.

CONCLUSION

In this urban Black African population, the risks of inguinal hernia for young men are similar to those reported from other sub-Saharan countries. However, an unexpected finding was the relatively large number of women with an inguinal hernia. Increased BMI and domestic employment may underline the risk for hernias in women in South Africa. However, we do recommend a larger multi-centre study in our local population to confirm our findings.

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