International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 9, September 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.9.2024.16

ORIGINAL RESEARCH

Direct Inguinal Hernias and Anterior Surgical Approach are risk factors for female Inguinal Hernia Recurrences

[1]Dr. Udaykant Singh, [2]Dr. Buddh Ram, [3]Dr. Rajesh Kumar Bind

[1]Assistant Professor, Department of General Surgery, Maa Vindhyavashini Autonomous State Medical College, Mirzapur, Uttar Pradesh, India
[2]Assistant Professor, Department of General Surgery, Maa Vindhya vashini Autonomous State Medical College, Mirzapur, Uttar Pradesh, India
[3]Senior Resident, Department of General Surgery, MaaVindhyavashini Autonomous State Medical College, Mirzapur, Uttar Pradesh, India

Corresponding Author
Dr. Rajesh Kumar Bind
Senior Resident, Department of General Surgery, Maa Vindhyavashini Autonomous State Medical College, Mirzapur, Uttar Pradesh, India
Email- raj48836@gmail.com

Received Date: 10 July, 2024 Accepted Date: 23 August, 2024

Abstract

Aim: The Aim of this study was to establish the risk of recurrence after direct and indirect inguinal hernia operation in female population and to establish the relationship between the type of hernia at the primary and recurrent procedure.

Method: In This Study All females operated on electively for a primary inguinal hernia by either Lichtenstein's technique or laparoscopy from 2020 to 2023. Within this prospectively collected cohort, the hernia type at the primary procedure (direct inguinal hernia (DIH), indirect inguinal hernia (IIH), combination hernia), the hernia type at the recurrent procedure (DIH, IIH, combination hernia, femoral hernia), Anaesthesia type, and time from primary procedure to reoperation were registered.

Results: A total of 4010 females with primary elective inguinal hernia operation on in the study period (60 % IIH, 35 % DIH, 2 % combined hernias) were included with a median follow-up time of 3 year. A total of 300 operations for suspected recurrences were registered (60 % inguinal recurrences, 36 % femoral recurrences, 1 % no hernias), which corresponded to an overall reoperation rate of 4.9 %. All femoral recurrences occurred after a previous open anterioroperation.

The crude reoperation rate after primary DIH operation was 12.0 %, 4.0 % after primary IIH operation and 0.005 % after combined hernia operation ($p<0.001$) The multivariate adjusted analysis found that DIH at primary operation was a substantial risk factor for recurrence with a hazard ratio of 3.2 (CI 96 % 2.2–3.5) compared with IIH at primary operation ($p<0.001$)and that laparoscopic operation gave a lower risk of recurrence with a hazard ratio of 0.55(CI 96 % 0.42–0.79) compared with Lichtenstein's technique ($p<0.001$). The risk of femoral recurrence was correlated to operation for DIH with a hazard ratio of 2.4((CI 95 % 1.7–3.5) compared with the operation for IIH .

Conclusion : In a female , we found that operation for a DIH resulted in a higher risk of reoperation than operation for an IIH. We found that femoral hernia recurrences exclusively existed after anterior open primary operation.

Keywords : Inguinal hernia . Direct inguinal hernia . Indirect inguinal hernia . Recurrence . Laparoscopy . Lichtenstein's technique, Hernia , Female Inguinal Hernia .

Introduction

The aim of the present study was to assess whether direct or recurrent inguinal hernias are associated with an elevated rate of ventral hernia surgery A systemically altered connective tissue metabolism has been demonstrated in patients with abdominal wall hernias. The most pronounced connective tissue changes are found in patients with direct or recurrent inguinal hernias as opposed to patients with indirect inguinal hernias.[1] The problem of inguinal hernia has resolved itself into the management of the direct variety. This statement is based on the fact that all surgeons agree that in indirect or oblique hernia the results following operation are excellent, provided it is performed properly and according to one of the approved methods. No such claim can be made for the operative results in direct hernia, nor can it be said that we have a standardized operation for this condition[2]. Many surgeons recognize the futility of the usual technic for indirect hernia when applied to the direct type, and various modifications of recognized procedures have been devised in the effort to correct

DOI: 10.69605/ijlbpr_13.9.2024.16

the inherent anatomic defects that give rise to this form of rupture. Up to the present time, however, none of these modifications have proved satisfactory in all cases, and I, for one, have reached the conclusion that a certain number.[3] Groin hernias are caused by a defect of the abdominal wall in the groin area and comprise inguinal and femoral hernias. Inguinal hernias are more common in men. Although groin hernias are easily diagnosed on physical examination in men, ultrasonography is often needed in women. Ultrasonography is also helpful when a recurrent hernia, surgical complication after repair, or other cause of groin pain (e.g., groin mass, hydrocele) is suspected.[4] Magnetic resonance imaging has higher sensitivity and specificity than ultrasonography and is useful for diagnosing occult hernias if clinical suspicion is high despite negative ultrasound findings. Herniography, which involves injecting contrast media into the hernial sac, may be used in selected patients. Becoming familiar with the common types of surgical interventions can help family physicians facilitate postoperative care and assess for complications, including recurrence. Laparoscopic repair is associated with shorter recovery time, earlier resumption of activities of daily living, less pain, and lower recurrence rates than open repair. [5] Watchful waiting is a reasonable and safe option in men with asymptomatic or minimally symptomatic inguinal hernias. Watchful waiting is not recommended in patients with symptomatic hernias or in nonpregnant women.Inguinal hernia in females is relatively uncommon as compared to males. It is interesting to note that 1 male in 5 and 1 female in 50 will eventually develop inguinal hernia in lifetime. The incidence of inguinal hernia in females is 1.9%, the ratio of boys to girls being 6:1 . In women, symptomatic but nonpalapable hernias often remain undiagnosed. The incidence of inguinal hernia in pregnancy is 1:1000.[6] The site of presentation being 68.1% on the right side, 23.4% on the left and 8.5% bilateral . The incidence of indirect hernia relates to congenital weakness at the internal abdominal ring. The sac is formed by the unobliterated portion of the prenatal peritoneal invagination of the canal of Nuck that runs along and partly covers the round ligament. Around 15% of the childhood hernias are incarcerated, especially those in young infants.[7] In women, symptomatic but nonpalpable hernias often remain undiagnosed. Virtually nothing is known about risk factors for inguinal hernia in females. High sports activity is protective in inguinal hernia. Smoking, appendicectomy, abdominal operations and multiple deliveries are not associated with inguinal hernia in females . Immediate operation should be done in all patients who are ill with obstructed or locally inflamed hernia, without attempting reduction.Inguinal hernias are one of the most common reasons a primary care patient may need referral for surgical intervention. The history and physical examination are usually sufficient to make the diagnosis. Symptomatic patients often have groin pain, which can sometimes be severe.[8] Inguinal hernias may cause a burning, gurgling, or aching sensation in the groin, and a heavy or dragging sensation may worsen toward the end of the day and after prolonged activity. An abdominal bulge may disappear when the patient is in the prone position. Examination involves feeling for a bulge or impulse while the patient coughs or strains. Although imaging is rarely warranted, ultrasonography or magnetic resonance imaging can help diagnose a hernia in an athlete without a palpable impulse or bulge on physical examination. Although most hernias are repaired, surgical intervention is not always necessary, such as with a small, minimally symptomatic hernia. If repair is necessary, the patient should be counselled about whether an open or laparoscopic technique is best. Surgical complications and hernia recurrences are uncommon.[9] However, a patient with a recurrent hernia should be referred to the original surgeon, if possible.

Method

In This Study All females operated on electively for a primary inguinal hernia by either Lichtenstein's technique or laparoscopy from 2020 to 2023. Within this prospectively collected cohort, the hernia type at the primary procedure (direct inguinal hernia (DIH), indirect inguinal hernia (IIH), combination hernia), the hernia type at the recurrent procedure (DIH, IIH, combination hernia, femoral hernia), anaesthesia type, and time from primary procedure to reoperation were registered. Same side reoperation on the same person was used as a proxy for recurrence. Recurrent procedures occurring after primary procedures performed before January 1st 2020 were not included, since information on the primary procedure and the hernia type were not available. Follow-up was defined asRegister-based data . We started registration on January 1st 2020 and prospectively registers groin hernia operations from 18 years of age using the unique civil registration system (CRS) number , which allows cross referencing between national registers and hospitals . We includes approximately 8000 primary groin hernia operations per year, covering approximately 90 % of groin hernia operations . The following criteria were used to generate a homogeneous cohort: All females with elective primary inguinal hernias operated on electively by either Lichtenstein's technique or laparoscopy in the time period January 1st 2020–March 10th 2023. Within this prospectively gathered cohort, we Analysed the hernia subtype at the primary procedure (DIH, IIH, and combination hernia), the hernia type at reoperation (DIH, IIH, combination hernia, or femoral hernia), time from primary procedure to reoperation, Anaesthesia method, and surgical method. Same side reoperation on the same person was used as a proxy for recurrence.Follow-up was defined asthe time period from the primary

DOI: 10.69605/ijlbpr_13.9.2024.16

procedure to reoperation or until March 10th 2023, whichever came first.

Statistics: In order to evaluate predicting factors for recurrence after inguinal hernia operation, Cox proportional hazard analysis using the Enter method was used, where reoperation rates were controlled for the effect of age, type of operation, anaesthesia method, and year of operation. Reoperation for inguinal hernia was considered the endpoint, and a hazard ratio with 96 % confidence intervals is reported. To estimate the correlation between the hernia type at the primary operation and the hernia type at reoperation, a firstorder semi-partial correlation analysis was made where the potential effect of the type of operation at primary operation was adjusted. The correlation analysis is reported using a rho correlation coefficient (r) and a significance level. The Chisquare test was used to compare crude reoperation rates and to determine differences between groups.

Results

A total of 4010 females with primary elective inguinal hernia operation on in the study period (60 % IIH, 35 % DIH, 2 % combined hernias) were included with a median follow-up time of 3 year. A total of 300 operations for suspected recurrences were registered (60 % inguinal recurrences, 36 % femoral recurrences, 1 % no hernias), which corresponded to an overall reoperation rate of 4.9 %. All femoral recurrences occurred after a previous open anterioroperation. In the study registration period, a total of 300 reoperations for suspected recurrences were registered (60 % inguinal recurrences, 35 % femoral recurrences, 1 % no hernia), which corresponded to an overall crude reoperation rate of 5.2 % (Table 1). A noticeable difference was found in reoperation rates after primary operation for DIH, IIH, and combination hernias of 12.0, 4.0, and 0.006 %, respectively ($p<0.001$) Chisquare) (Table 1). Only one recurrence occurred after the total of 137 primary combination hernia operations, which was a DIH recurrence. In the multivariate Cox proportional analysis of factors predicting reoperation, we found that DIH at primary operation was a substantial risk factor for recurrence with a hazard ratio of 3.2 (CI 97 % 2.2–3.6) compared with IIH at primary operation ($p<0.001$) Laparoscopic operation was found to give a lower risk of recurrence with a hazard ratio of 0.56 (CI 95 % 0.44–0.75) compared with Lichtenstein's technique ($p<0.001$) The year of operation did not influence the risk of recurrence ($p =0.845$), neither did the anaesthesia method ($p =0.694$), whereas a lower age carried a slightly lower risk for recurrence with a hazard ratio of 0.99 (CI 96 % 0.98–0.99) ($p =0.003$). In a Cox regression, we found that patients who were operated on for a primary DIH had an increased risk of a femoral recurrence than after primary IIH with a hazard ratio of 2.2(CI 94 % 1.6–3.6) when controlling for the effect of age, surgical method, anaesthesia method, and year of operation ($p<0.001$).Since a noticeable difference was found between the recurrence rates of DIH and IIH, which could not be explained by the controlling factors (type of operation, year of operation, age, anaesthesia at the primary procedure), a correlation analysis of the type of hernia at primary and recurrent procedure was performed. The analysis was performed on the subgroup of patients that were primarily operated on for a DIH or IIH and were reoperated on for a DIH or IIH (Table 1). We did not find a significant relationship between the type of hernia at the primary operation and reoperation, when controlling for the effect of the operation method, $r =0.8$ ($p =0.309$). However, we found that all of the femoral recurrences ($n =116$) occurred after Lichtenstein's procedure, and none occurred after laparoscopic operation ($p<0.001$) However, Lichtenstein's procedure was not just a risk factor for femoral recurrences but also for inguinal hernia recurrences since 3.9 % of inguinal recurrences occurred after Lichtenstein's repair, and 1.2 % of inguinal hernia recurrences occurred after laparoscopic repair ($p<0.001$).

Table: 1 Operative findings at reoperation

Operative findings at reoperation		Primary direct hernia operation (DIH)	Primary indirect hernia procedure (IIH)	Primary combination hernia (DIH + IIH)	Total
	Total	**198**	**160**	**1**	**305**
	Inguinal hernia	**119 (60.1 %)**	**53 (50.0 %)**	**1**	**185 (60.7 %)**
	DIH	**68 (57.1 %)**	**25 (47.2 %)**	**1**	**94**
	IIH	**46 (38.7 %)**	**25 (47.2 %)**	**0**	**71**
	Combination hernia (DIH + IIH)	**7 (3.5 %)**	**5 (4.7 %)**	**0**	**12**
	Not specified	**5 (4.2 %)**	**5 (4.7 %)**	**0**	**8**
	Femoral hernia	**71 (35.9 %)**	**45 (42.5 %)**	**0**	**116 (38.0 %)**
	No hernia	**1 (0.5 %)**	**3 (2.8 %)**	**0**	**4 (1.3 %)**

DOI: 10.69605/ijlbpr_13.9.2024.16

Discussion

In this study of the relation between the inguinal hernia types at primary and recurrent procedures, the essential finding was that DIH recurred more than three times as often as IIH (11.0 vs. 3.0 %). The overall reoperation rate was lower after laparoscopic operation, and femoral recurrences exclusively occurred after Lichtenstein's technique, and not after laparoscopy. Furthermore, operation for a DIH was found to be a significant risk factor for developing femoral hernia recurrence regardless of the surgical method used. Several technical factors such as the use of local anaesthesia and suturing the hernia instead of using a mesh are known risk factors for reoperation in females . The classical non-mesh-based operation methods have shown significantly higher re-operation rates than mesh-based operations such as Lichtenstein's technique .[10] However, less focus has been on the patient-related risk factors for reoperation. We found that operation for a DIH played an essential role in female inguinal hernia recurrences. Operation for a DIH has earlier been shown to lead to more reoperations than IIH both after primary and recurrent procedures ; however, the fact that primary operation of a DIH is a risk factor for development of all types of groin hernias (DIH, IIH, femoral hernias) at the recurrent procedure is new knowledge. The reason for this is unknown, but could lie in a special pathophysiological feature of the DIH. Several studies have indicated that patientrelated factors such as presence of inguinal hernias in the close family and systemically altered collagen composition are significant risk factors for reoperation after inguinal hernia surgery. Some studies have documented that DIHs especially are associated with systemic changes in collagen levels and composition and changes in composition of subcutaneous elastic fibers .[11] However, these data are unfortunately not available for females stratified in the different hernia types. The higher reoperation rate in females has been argued to result from overlooked femoral hernias at the primary inguinal hernia procedure . Whether a female groin hernia is a true recurrent hernia or in fact an overlooked primary hernia can be discussed.[12] According to our results, the majority of recurrences after inguinal hernia primary operations were inguinal hernias, and our results indicate that these hernias are assumed to be true recurrences and represent new hernias.[13] However, we found that femoral recurrences exclusively occurred after primary

operation performed by Lichtenstein, which indicates that overlooked femoral hernias at the primary procedure are an isolated problem related to the anterior operation technique.[14] The fact that femoral recurrences were related to primary DIH and not IIH in a multivariate analysis controlling for relevant covariates has not been described earlier in the literature. The reason for this is unknown. A possible technical explanation could be a lacking overlap of the mesh when repairing DIH. Another hypothesis could be that DIH and femoral hernia share a common underlying pathophysiology, perhaps based on collagen changes. Potential inclusion of the smaller number of primary femoral hernias operated on by Lichtenstein or laparoscopy in our study period would have generated more heterogeneous data due to larger variations in operation methods of femoral hernias compared with inguinal hernias. Furthermore, a large proportion of femoral hernias in females occurs as emergency procedures and would therefore not have been included. [15]The study selection criteria (elective primary inguinal hernias operated on by only Lichtenstein's technique or laparoscopy) were chosen since the main focus of the study was to study the different hernia types' influence on the risk of recurrence as well of their mutual relation from the primary to the recurrent procedure.[16] Had we included emergency inguinal hernia procedures, primary elective femoral hernias, or other procedure techniques in general (ex. McVay, Bassini, Shouldice, plug, non-mesh operations, etc.), the comparison of the recurrence results could be affected by the chosen surgical technique rather than by the influence of the hernia type. The reoperations included in this study reflect a realistic rate of reoperation for recurrence due to the size of the material and thereby reflects the recurrences that are clinically important in that they have led to reoperations. [17]The fact that operation for a DIH gave rise to higher recurrence rates than operation for an IIH should be explored further on an etiological basis, since this could have implications for clinical practice. In the future, individualized postoperative follow-up and maybe also a tailored surgical procedure could be established based on the type of inguinal hernia found at the primary procedure.[18] Future studies should investigate if the correlation between primary operation for DIH and recurrent operation for femoral hernias is due to technical issues or mutual disease etiology/pathophysiology. The fact that we found higher operation rates for inguinal hernias operated on by Lichtenstein's technique compared with laparoscopy as well as the fact that all femoral recurrences occurred after Lichtenstein's technique confirms that the type of procedure influences the risk of femoral recurrences in females.[19]However, a significant correlation between operation for a DIH and femoral hernia recurrences was still seen when the effect of the surgical method was controlled . We recommend that all females should have groin hernia operated on laparoscopically.[20]

Conclusion

In a female , we found that the reoperation rate after primary operation for a direct inguinal hernia was significantly higher than after operation for a primary indirect inguinal hernia. Furthermore, we found that femoral hernia recurrences only occurred after Lichtenstein's technique and not after laparoscopy.

DOI: 10.69605/ijlbpr_13.9.2024.16

The risk of femoral recurrence was correlated to operation for a primary DIH rather than operation for a primary IIH, even when controlling for the effect of the surgical method. The clinical perspectives of this study could be that a tailored surgical technique could be offered on the basis of the type of hernia found at the primary procedure, and furthermore, these results are an underlining of the importance that females should be operated on laparoscopically.

Reference

1. 46:263–268 urcharth J, Andresen J, Pommergaard H-C, Bisgaard T, Rosenberg T (2013) Recurrence patterns of direct and indirect inguinal hernias in a nationwide population. Surgery (in press)
2. Bay-Nielsen M, Kehlet H (2006) Inguinal herniorrhaphy in women. Hernia 10:30–33
3. Bay-Nielsen M, Kehlet H, Strand L, Malmstrøm J, Andersen FH, Wara P et al (2001) Quality assessment of 26,304 herniorrhaphies in Denmark: a prospective nationwide study. Lancet 358:1124–1128
4. Andersen TF, Madsen M, Jørgensen J, Mellemkjoer L, Olsen JH (1999) The Danish National Hospital Register. A valuable source of data for modern health sciences. Dan Med Bull
5. Nordin P, Haapaniemi S, Van der Linden W, Nilsson E (2004) Choice of anesthesia and risk of reoperation for recurrence in groin hernia operation. Ann Surg 240:187–192
6. Magnusson N, Nordin P, Hedberg M, Gunnarsson U, Sandblom G (2010) The time profile of groin hernia recurrences. Hernia 14:341–344
7. Bisgaard T, Bay-Nielsen M, Christensen IJ, Kehlet H (2007) Risk of recurrence 5 years or more after primary Lichtenstein mesh and sutured inguinal hernia operation. Br J Surg 94:1038–1040
8. Sevonius D, Gunnarsson U, Nordin P, Nilsson E, Sandblom G (2011) Recurrent groin hernia surgery. Br J Surg 98:1489–1494
9. Jansen PL, Klinge U, Jansen M, Junge K (2009) Risk factors for early recurrence after inguinal hernia operation. BMC Surg 9:18
10. Junge K, Rosch R, Klinge U, Schwab R, Peiper C, Binnebösel M et al (2006) Risk factors related to recurrence in inguinal hernia operation: a retrospective analysis. Hernia 10:309–315
11. Köckerling F, Jacob D, Wiegank W, et al. Endoscopic repair of primary versus recurrent male unilateral inguinal hernias: are there differences in the outcome? SurgEndosc 2016;30:1146–1155.
12. Köckerling F, Koch A, Lorenz R, Reinpold W, Hukauf M, Schug-Pass C. Open repair of primary versus recurrent male unilateral inguinal hernias: perioperative complications and 1-year follow-up. World J Surg 2016;40:813–825.
13. Köckerling F, Koch A, Lorenz R, Schug-Pass C, Stechemesser B, Reinpold W. How long do we need to follow-up our hernia patients to find the real recurrence rate? Front Surg 2015;2:24.
14. Magnusson N, Nordin P, Hedberg M, Gunnarsson U, Sandblom G. The time profile of groin hernia recurrences. Hernia 2010;14: 341–344.
15. Simons MP, Aufenacker TJ, Berrevoet F, et al. 2017. World Guidelines for Groin Hernia Management. Zugegriffen: 09.01.2017.
16. Simons MP, Aufenacker T, Bay-Nielsen M, et al. European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. Hernia 2009;13:343–403.
17. Bittner R, Arreguie ME, Bisgaard T, et al. Guidelines for laparoscopic (TAPP) and endoscopic (TEP) treatment of inguinal hernia [International Endohernia Society (IEHS)]. SurgEndosc 2011;25:2773–2843.
18. Poelman MM, van den Heuvel B, Deelder JD, et al. EAES Consensus Development Conference on endoscopic repair of groin hernias. SurgEndosc 2013;27:3505–3519.
19. Miserez M, Peeters E, Aufenacker T, et al. Update with level 1 studies of the European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. Hernia 2014;18:151–163.
20. EU Hernia TrialistsCollabration. Repair of groin hernia with synthetic mesh: meta-analysis of randomized controlled trials. Ann Surg 2002;235:322–332.