



## Analysis of surgical significance of pathological examination of hernia sacs

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**Article History:** Received: 15.05.2023

Revised: 23.06.2023

Accepted: 27.06.2023

### Abstract

**Background:** Our goal was to look into the diseases in the hernia sac, the prevalence of cancer, and to determine whether it was necessary to continue using the current methods for histologically examining the hernia sac.

**Methods:** The study comprised patients who underwent hernia surgery at our clinic between October 2021 and October 2022. According to the type of hernia, we separated the patients into four groups. We looked at the patients' demographics, the diseases within the hernia sac, the results of the histological investigation of the hernia sac, and the clinical characteristics of malignancy in patients who already had cancer.

**Results:** In our hospital, 107 patients had inguinal, incisional, umbilical, or femoral hernias that needed to be repaired. In the hernia sac, there was cancer in three patients (2.8%). Three hernia sacs had tumors: one in the umbilical (3.12%), one in the inguinal (1.79%), and one in the incisional (5.88%). The majority of the additional diseases discovered in the hernia sac were omentum, lipomas, and herniated bowel segments.

**Conclusion:** Hernia sacs could be the first sign of an underlying cancer; therefore, if aberrant pathology findings are found following surgery, a histological study should be done to rule out malignancy. A hidden malignancy is to be found through a histology examination.

**Keywords:** Hernia, Metastasis, Carcinoma and Surgical Pathology.

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## INTRODUCTION

One of the most frequent surgical treatments across all age groups is hernia repair (1). Rarely will a hernia sac specimen's histopathological analysis reveal an unexpected diagnosis (2). Numerous reports of benign and malignant pathology in hernia sacs have been made at various rates. Hernia sacs are a frequent sample in surgical pathology that can produce a variety of clinical findings (3). Some surgeons submit only surgical samples for pathological analysis, while others are more selective. (4).

Some authors support routine histological examination of hernia sacs because, even if the hernia sac appears to be normal on macroscopic inspection, a hidden malignant lesion may be discovered during a histopathological examination (5). Additionally, peritoneal biopsy may be possible only through microscopic examination of hernia sacs. The necessity of frequent microscopic examination is still up for dispute (6). According to studies, unexpected results are not as effective as predicted ones; therefore, routine paediatric inguinal hernia sac presentations are not required (7). Some facilities only frequently examine abdominal wall hernias in adults rather than routinely performing microscopic examinations of inguinal hernia sacs (8). All adult hernia sac specimens should be submitted to pathology, according to the American College of Pathologists; however, the choice is ultimately up to the pathologist (9).

The goal of the histological analysis of the hernia sac is to find any hidden cancers, serious diseases like tuberculosis, or iatrogenic damage to the spermatic cord components that could lead to infertility and its associated medico-legal issues (10). Macroscopic and microscopic inspections of all hernia sacs are regularly carried out at our facility.

Our goal in conducting this study was to look into the pathological results and the frequency of pathological surprises in hernia sacs and to confirm the need for continuing the present procedures in the histological assessment of the hernia sac.

## MATERIAL AND METHODS

The study included 107 patients who underwent surgery at the TBRI between October 2020 and October 2021 with diagnoses of umbilical, incisional, femoral, and inguinal hernia. All patients who come to surgery outpatient clinic complaining of hernia were included in the study, while we exclude only patients who refuse to join the study or have any other contraindications to do the operation.

Depending on the hernia kind, we split the patients into four groups:

Inguinal hernia, Group 1

Incisional hernia, group 2

Umbilical hernia, Group 3

Femoral hernia is in group 4.

Group assessments of the patients' age, sex, elective or emergency surgery, and histopathological examination outcomes were made. Examined was the treatment regimen for patients whose histological analysis revealed pathology.

Preoperatively: All patients are examined in outpatient clinic and in the ward, do routine laboratory examination and revised by anesthesia team.

Post operatively: Patients will be evaluated by physicians after 1 week, 2 weeks and 4 weeks after surgery. Complications were recorded in clinical charts. All infections, Seroma, pain and recurrence and their treatments will be evaluated.

## STATISTICAL ANALYSIS

We employed the software package IBM SPSS Statistics for Windows, version 24 (IBM Corp., Armonk, NY, USA). ANOVA analysis was used to determine the relationship between patient groups and age, with the Bonferroni method being used to identify the source of differentiation between the groups. Chisquare (2) test was used to determine the relationship between patient groups and gender and operation status. Statistical significance level was taken at  $p < 0.05$  in all tests.

## Ethical approval

The work was done in accordance with the World Medical Association's Code of Ethics for Human Experiments (Declaration of Helsinki) and its later amendments (GCP guidelines) or comparable ethical standards. The study's protocol was approved by the TBRI institutional review board under Federal Wide Assurance (FWA 00010609).

## Results

In all, 107 patients took part in the trial. Each hernia specimen collected at our facility was sent for a pathological review. In group 1, there were 56 patients (52.3%), group 2 had 17 patients (15.88%), group 3 had 32 patients (29.9%), and group 4 had 2 patients (1.87%). In group 1, the mean age was 51.69 years, in group 2, it was 64.9 years, in group 3, it was 55.43 years, and in group 4, it was 71.5 years. The difference between these groups was statistically significant ( $P < 0.001$ ). In all groups, elective procedures were statistically more important than emergency procedures ( $P < 0.001$ ) (Table 1).

Regarding the pathological examination of the hernia sacs in group 1, the most prevalent finding was "no pathology or only inflammation" in 32 (57.14%) patients, followed by "lipoma" in 14

(25.0%), "omentum" in 5 (8.92%), and "appendix vermiformis" in 2 (3.57%), while granulomatous lymphadenitis, ovary, and ovarian carcinoma were each discovered in 1 patient. (Table 2).

In group 2, "no pathology or only inflammation" was observed in 7 (41.18%) cases, the omentum was discovered in 9 (52.94%) patients, and a gastrointestinal stromal tumor was discovered in 1 (5.88%) patient. (Table 2).

In group 3, there were 24 (75.0%) cases in which "no pathology or only inflammation" was present, "omentum" was present in 6 (18.75%) patients, "gastrointestinal stromal tumour" was present in one patient (3.12%), and "necrosis of small bowel segment" was seen in one patient (3.12%). (Table 2).

In group 4, 1 (50%) case had "no pathology or only inflammation" and 1(50%) case had necrosis of small bowel segment (Table 2).

**Table 1:** patient characteristics

Parameters	Group 1 (n = 56)	Group 2 (n = 17)	Group 3 (n = 32)	Group 4 (n = 2)	P<Value
Male/female	51/5	11/6	15/17	0/2	
Age (mean±SD) (min–max)	51.69±14.04 (11–71)	64.9±6.89 (19–80)	55.43±14.8 (9–75)	71.5±2.12 (70-73)	<0.002
Operation					<0.001
Elective	54 (96.4%)	16(94.1%)	29 (90.6%)	1 (50%)	
Emergency	2 (3.6%)	1(5.9%)	3(9.4%)	1 (50%)	

chi-square ( $\chi^2$ ) test and Anova test were used.

**Table 2:** Pathology in Hernias

Diagnosis	Group 1 (n = 56)	Group 2 (n = 17)	Group 3 (n = 32)	Group 4 (n = 2)
No pathology or only inflammation	32(57.14%)	7 (41.18%)	24(75.0%)	1(50%)
Granulomatous lymphadenitis*	1(1.79%)	0	0	0
Omentum	5(8.92%)	9 (52.94%)	6(18.75%)	0
Appendix vermiformis	2(3.57%)	0	0	0
Ovary	1(1.79%)	0	0	0
Lipoma	14(25.0%)	0	0	0
Ovary carcinoma	1(1.79%)	0	0	0
Gastrointestinal stromal tumor*	0	1 (5.88%)	1(3.12%)	0
Necrosis of small bowel segment	0	0	1(3.12%)	1(50%)

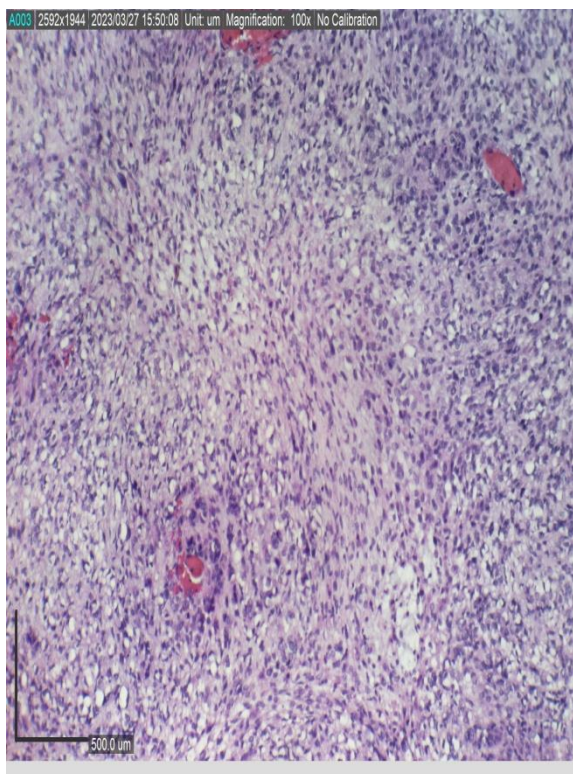


**Fig.1:** hernia sac containing appendix.

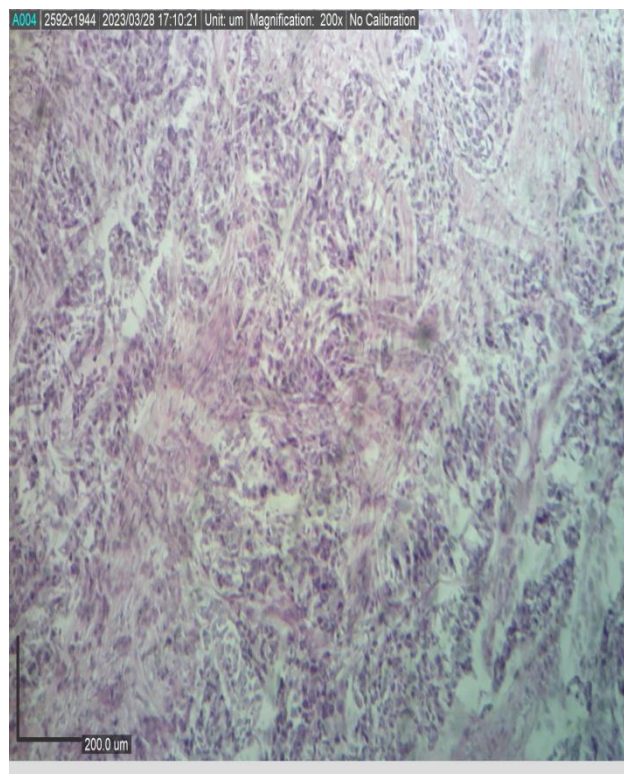


**Fig.2:** hernia sac containing stomach and omentum





**Fig.3:** GIST. Infiltrating hernia sac.



**Fig.4:** (ovarian carcinoma) infiltrating hernia sac.

## DISCUSSION

One of the most frequently performed surgical procedures worldwide is hernia repair. The research did not find it to be cost-effective to routinely examine hernia sacs. There is debate about whether all hernia sac specimens must be given for histological analysis. There are arguments in favour of evaluating aberrant tissue samples that point to a surgically detected underlying disease condition. The most frequent carcinomas seen in the hernia sac are gastrointestinal malignancies, particularly colon adenocarcinomas. (11).

In pathological examinations of the hernia sac in all hernia varieties, we discovered that inflammation was the most frequent cause. Because the hernia sac has been irritated over time, this inflammation is a benign finding. The management of the patient is unaffected by this and may reflect a long-standing circumstance.

In our study, two (3.57%) patients had appendix vermiformis, which was not inflamed; therefore, we did not conduct an appendectomy. The occurrence of appendix vermiformis in the inguinal hernia sac is uncommon and reported to be between 0.6 and 1% in the literature (12).

In our study, cord lipoma was discovered in 14 cases (25.0%), while omentum was reported in 5 cases (8.92%). The lipoma of the cord detected in the inguinal hernia sac implies an anatomical variant of this region rather than a real tumor (13).

In 1426 hernia sacs of subjects with abdominal wall hernias that had been histologically evaluated,

Wang et al. (14) discovered a malignancy rate of 1.2%. The most prevalent source in their dataset was of ovarian origin, but there were also pancreatic and prostate tumors, in the patients in our series, there were three cases of cancer in the hernia sacs (2.8%). Incisional, inguinal, and umbilical hernia sacs each had one tumor. Additionally, Wang et al. discovered that there was a 0.4% incidence of malignancy in inguinal hernia sacs in their series, whereas our study only discovered one case of ovarian malignancy (1.79%).

In our dataset, one case of GIST was discovered through histological analysis of the incisional hernia sac. In a series of 556 patients, 197 of them had an incisional hernia by Topal et al. (15), and metastasis from stomach cancer was found in the incisional hernia sac in two individuals. In contrast to the other patient, one of these patients had macroscopic findings.

Robert et al. discovered that gynecologic malignancies were the cause of 45% of hernia sacs that were proven to be malignant in a group of 3117 patients (16), Within the incisional hernia sac of two patients in another series, metastasis from gastric cancer was discovered (17).

The most frequent digestive tract mesenchymal tumours are gastrointestinal stromal tumours. With 60% to 70%, the stomach is the most typical origin. Rarely do they affect the abdominal peritoneum, hernia sac, or mesentery, and they typically manifest as metastases of the gastrointestinal tract's

primary disease. In the literature, they have previously been mentioned as occurring in the inguinal hernia sac (18). Two cases of GIST were found in our investigation; one occurred after the surgery of an umbilical hernia, and the other occurred during the repair of an incisional hernia. On macroscopical examination, the hernia sac in the two patients exhibited a mass formation linked to it. It was discovered that the tumour was gastrointestinal in origin after the abdomen was examined. There was a wedge resection. The presence of a stromal tumour in the patients prior to surgery was unknown at the time.

As in many other series (19), omentum and bowel segment necrosis were the pathologies of incisional and umbilical hernias in our series.

Up to 5% of all inguinal hernias are femoral hernias. Women are three to four times more likely to have them. They typically happen when people are middle-aged or older. According to the literature, the rate of strangulation is between 30% and 40% (20). Femoral hernias were statistically more likely in females and older patients in our study than other hernias ( $P = 0.001$ ), and they were also statistically more common to occur at an advanced age. Any cancerous tissue in the hernia sacs was not found. In 50% of the hernia sac specimens, there was bowel segment necrosis.

There may be some rationale for routine histological investigation of every hernia sac in terms of law, medicine, and quality control. However, only a small percentage of patients with routine tests of all hernia sacs that appeared normal during the operation had positive results. Any patient who exhibits a new hernia and has a history of intra-abdominal malignancy should be checked for tumour recurrence. Histopathological investigation should be carried out to rule out cancer if aberrant pathology findings are found following surgery. A hidden malignancy is to be found by the histological investigation (21).

## CONCLUSION

The histopathological and microscopic examination of every abdominal wall hernia sac should be routinely performed to detect hidden pathology or any inflammation. The College of American Pathologists' current recommendations urge microscopic examination of all abdominal wall hernias, but they leave the decision to microscopically examine inguinal hernias to the institution or pathologist.

## Acknowledgment

**General:** Not relevant

## Funding justification

No money was given.

## Details about the author

Author of the correspondence Mohamed A. Elashry is the recipient.

## Conflicts of interest

The authors stated that they do not have any conflicting interests.

## Availability of the data and materials

In this published article, all pertinent data examined during this investigation are presented in tabular form. The corresponding author can provide the original datasets used in the current work upon reasonable request.

**Informed consent statement:** Each participant in the study signed an informed consent.

## Authors' contribution

The study's design was collaborated on by Mohamed Elashry, Amr Moustafa, Mohamed Abbas, and Ahmed Allam. Mohamed S. Hedaya collected the data from medical records, while Mohamed Elashry, Olfat Hammam, Fatma Hegab, and Mohamed S. Hedaya were involved in data analysis, interpretation, and paper preparation. The final papers were reviewed by all authors, who also gave their approval.

## Ethical approval:

Our study protocol number 581 was approved by the TBRI ethical committee board under Federal Wide Assurance (FWA 00010609), and the study was conducted in accordance with the World Medical Association's Code of Ethics for Human Experiments (Declaration of Helsinki).

## Consent for publication

Not applicable

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