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Original Article

Is routine pathological examination of hernia sac necessary?

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Abstract

Aim: Minimally invasive hernia repair methods in which the hernia sac is not excised are applied frequently, bringing into question the necessity of routine pathological examination when the hernia sac is excised. Here, we aim to discuss the pathology results and unexpected histopathological findings of 437 sequential patients who underwent abdominal wall and inguinal hernia operation.

Materials and Metods: Patients who underwent hernia surgeries and had the hernia sac sent for histopathological examinations at our hospital were retrospectively screened. Emergency and elective operated patients were included; hernia repairs without pathologic examination were excluded from the study. Pathology results were categorized into two groups as expected findings and unexpected findings.

Results: A total of 437 patients were included in the study. Of these patients, 259 (59.3%) were male and the mean age was 51±16 years. Expected pathological findings were 98.9% and unexpected pathological findings were 1.1%. Unexpected pathological findings results were ranked according to frequency as follows: accessory adrenal cortex in two cases (0.4%), endometriosis in one (0.2%), skin pseudo epithelial hyperplasia in one (0.2%), and colon wall in one (0.2%).

Conclusion: Histologically, unusual findings in hernia sacs were seen only in 1.1% and they were all benign. . For this reason, we think that microscopic examination of adult hernia sac specimens, other than those that cannot be clearly demonstrated to be benign macroscopically, unnecessarily increase the workload and cost.

Keywords: Hernia sac; inguinal hernia; incisional hernia; intestine; omentum

INTRODUCTION

During hernia operations, hernia sacs are routinely excised and in hopes of detecting neoplasm sent for pathological examination. However, some observers have recommended that only macroscopic evaluation should be routinely performed, with microscopic examination by pathologists and its attendant time, labor and financial costs reserved for cases where these is reasonable need (1). In addition, due to this financial burden, there are publications advocating sending the hernia sac to pathology only at the surgeon's discretion (2). Minimally invasive hernia repair methods are applied increasingly frequently, and in these the hernia sac is not excised at all. This situation has caused us to question the necessity of routine pathological examination of the hernia sac.

In our clinic, we routinely send the hernia sac to the pathology lab and leave the final decision to the pathologist about whether to investigate further. There are different clinics that routinely send the inguinal hernia sac to the pathology department (3). The American College of Pathology recommends that all adult hernia specimens be sent to pathology but stipulate that microscopic examination for the inguinal hernia sac may be left to the discretion of the pathologist (4).

Here, we aimed to discuss the necessity of pathological examination by evaluating the pathology results and unexpected histopathological findings of 437 patients who underwent abdominal wall and inguinal hernia repairs.

MATERIALS and METHODS

This study was approved by the Gaziantep University Ethical Community (2020/175) and registered in an international database (ClinicalTrials.gov NCT 04383249). Consecutive patients who underwent hernia surgery and had their hernia sac sent for histopathological examination between January 2016 and February 2020 at our hospital was retrospectively screened. Emergency and elective operated patients with primary or recurrent

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hernia were included; hernia repairs without pathologic examinations were excluded from the study. Patients' gender, age, operation notes, and pathology results were analyzed. Pathology results were categorized into two groups according to intraoperative macroscopic findings: expected findings and unexpected findings. The expected pathological findings group included: fibro adipose tissue or inflammation, foreign-body reaction, hernia sac, lipoma, omentum, foreign-body reaction to surgical meshes, fibromuscular tissue, focal liver parenchyma, small intestine, benign hyalinized nodule, and benign cystic adipose tissue. The unexpected pathological findings group included: accessory adrenal cortex, endometriosis, pseudo epithelial hyperplasia, and colon wall. Quantitative variables were expressed as mean ± SD, median, min-max, and interval. Qualitative variables were reported as numbers and percentages (%).

RESULTS

A total of 437 patients were included in the study. The mean age of the patients was 51 ± 16 years. Of these patients, 259 (59.3%) were male and 178 (40.7%) were female; with a mean age was 49 ± 17 in men and 52 ± 13 in women. Abdominal wall hernia surgery was the most common, in 223 patients (51%). Of these, 122 (28% of the total cohort) had incisional hernia, 87 (20%) had umbilical hernia, and epigastric hernia was noted in 14 patients (3.2%). There were 214 (49%) patients who had surgery for inguinal hernia; among these, indirect hernias were detected in 212 (48.5% of the total cohort) and femoral hernias in two patients (0.4%) (Table 1).

Table 1. Demographic characteristics of patients with pathological examination of hernia sac

Patients Characteristics	Results (n(%), mean ± SD)
Total Patient	437
Gender	
Male	259 (59.3%)
Female	178 (40.7%)
Mean age	
All the patients	51 ± 16
Male	49 ± 17
Female	52 ± 13
Hernia Types	
Abdominal Wall	223/437 (51%)
Incisional hernia	122 (28%)
Umbilical hernia	87 (20%)
Epigastric hernia	14 (3.2%)
Inguinal Herniler	214/437 (49%)
Indirect inguinal hernia	212 (48.5%)
Femoral hernia	2 (0.4%)

SD: Standart deviation

Table 2. Results of hernia sac's pathological examination

Expected pathologies	**Inguinal/Abdominal**	**432/437 (98.9%)**
Fibroadipose tissue	137/97	234 (53.5%)
Fibroadipose tissue plus inflammation	30/69	99 (22.6%)
Foreign body reaction	0/24	24 (5.5%)
Hernia sac	13/9	22 (5%)
Lipoma	18/2	20 (4.6%)
Omentum	7/10	17 (3.9%)
Mesh + foreign body reaction	0/8	8 (1.8%)
Fibromuscular tissue	3/1	4 (0.9%)
Focal liver parenchyma	0/1	1 (0.2%)
İntestine	0/1	1 (0.2%)
Benign hyalinized nodule	1/0	1 (0.2%)
Benign cystic adipose tissue	1/0	1 (0.2%)
Unexpected pathologies		**5/437 (1.1%)**
Accessory adrenal cortex	2/0	2 (0.4%)
Endometriosis	1/0	1 (0.2%)
Pseudoepithelial hyperplasia in the skin	0/1	1 (0.2%)
Colon wall	1/0	1 (0.2%)

There were 432 (98.9%) patients with pathological findings categorized as expected, ranked according to frequency as follows: fibro adipose tissue 234 (53.5%), inflammation with fibro adipose tissue 99 (22.6%), foreign-body reaction 24 (5.5%), hernia sac 22 (5%), lipoma 20 (4.6%), omentum 17 (3.9%), foreign-body reaction plus mesh 8 (1.8%), fibromuscular tissue 4 (0.9%), and single findings of focal liver parenchyma (0.2%), small intestine (0.2%), benign hyalinized nodule (0.2%), and benign cystic adipose tissue (0.2%). There were 5 (1.1%) patients with unexpected pathological findings were ranked according to frequency as follows: two patients had accessory adrenal cortex (0.4%) in sac while, endometriosis, skin pseudo epithelial hyperplasia, and colon wall was found 1 patient each. Of these unexpected pathological findings, only that of pseudoepithelial hyperplasia in the skin was detected in the abdominal hernia sac, while others were detected in the inguinal hernia sac (Table 2).

There were 40 patients (9.1%) who required emergency surgery due to incarceration. Emergency surgery was needed in 22 (55%) patients with incisional hernia and least frequently in epigastric hernia (2 patients, 5%). The majority of incarceration tissue types observed in pathology were of the small intestine (18 patients, 45%), and colon was the least, in two cases (5%). Data from three patients related to incarcerated tissue were not available (Table 3).

Table 3. Distribution of patients who underwent emergency hernia repair

Incarcerated tissue	Incisional	Inguinal	Umbilical	Epigastric	Total
Small intestine	12	4	2	-	18 (45%)
Omentum	8	4	3	2	17 (42.5%)
n/a	-	3	-	-	3 (7.5%)
Colon	2	-	-	-	2 (5%)
Total	22 (55%)	11 (27.5%)	5 (12.5%)	2 (5%)	40

DISCUSSION

The hernia has two key components. The first is the defect and is related to the size and localization of the defect in the fascia. The second is the hernia sac and protrusion of the peritoneum from the defect. The hernia sac may be empty or may contain tissue of any organs from the intraperitoneal region (5). In our study, the tissues that were thought to be excised together due to their tight adhesion to the hernia sac were included in the expected findings group because they were noticed macroscopically intraoperatively. These were findings such as focal liver parenchyma, small intestine, lipoma, omentum, and mesh. In a female patient who was operated on due to incarcerated inguinal hernia in emergency conditions, the finding of the colon wall was not known until the pathology was reported, so it was considered an unexpected result.

The incidence which was quoted to be 3-8% in previous study, strangulation frequency and hospitalization time of the inguinal hernia, all increase with age (6). Incision hernias are an iatrogenic form of hernia, and approximately 17% were performed due to incarceration (7,8). In our study, 40 patients (9.1%) had emergency surgery due to incarceration and 55% of these patients were incisional hernias. Epigastric hernia was detected in two (5%) patients and was the least common incarceration. The majority of the incarcerated tissues in the hernia sacs consisted of small intestine and the minority colon in 18 (45%) and two (5%) patients, respectively.

In a survey of pediatric surgeons, the vast majority of participants declared that they never send excised tissue to the pathology department and recommended routine pathological examination if institutional necessity (9). Abnormal pathological findings were present in only 3% of pathology results of patients under 18 years of age who underwent surgery for inguinal hernia and hydrocele. They suggested that pathological examination should not be used in routine, and because of its high cost and low likelihood of abnormal pathological findings, should be done only in cases of high clinical suspicion (10).

Many studies argue that routine evaluation of the pediatric hernia sac is unnecessary because the likelihood of unexpected pathology results is low (11,12). While some centers do not recommend a routine microscopic examination in inguinal hernias in adults, they do recommend them for abdominal wall hernias (13,14). The expected pathologies in the 437 hernia sacs examined in this study constituted 98.9% of the results and were similar to rates reported in the literature.

There is some risk that the body may perceive the polymer structure of the material used in hernia operations as a foreign body. Heavy weight meshes may cause a latent acute inflammatory reaction; in contrast, lightweight meshes can cause a chronic inflammatory reaction. This tissue reaction varies according to the characteristics of the material used. A histological appearance occurs permanently in the tissue three months later (15). In our study, a foreign-body reaction related to mesh was detected in eight (1.8%) patients. In addition, the foreign-body reaction not associated with mesh in pathology examination was detected in a total of 24 (5.5%) patients all of them were operated on for an abdominal hernia. These reactions are thought to be secondary to recurrent surgery.

Lipomas are the most common skin tumors. They are usually solitary and can be located anywhere in the body where adipose tissue is seen (16). Lipoma subtypes include angiolipoma, fibro lipoma, intramuscular (infiltrative) lipoma, benign lipoblastoma, and spindle cell lipoma, though 80% of cases are ordinary lipomas (17). Adipose tissue in the inguinal canal is called adipose hernia, pilot tags and fat pad. Inguinal canal lipomas are defined as an irreducible ball medially located in the testicular artery. This definition, first made by Cloquet, and is known as Cloquet's lipoma theory (18). Although there is no clear information that inguinal canal lipomas are malignant, the malignancy rate has been reported as 0.0018-0.35%; therefore, lipomas should be excised (19,20). The etiology of inguinal canal lipomas is not clear (21). Pathology findings from 20 (4.6%) of our patients were reported as lipomas, two of which were of the abdominal region and 18 of the inguinal regions.

Endometriosis is the presence of endometrial tissue in another anatomical region outside of the uterus (22). About 11% of women are reported to encounter endometriosis at some point in their lifetime, but the true prevalence is difficult to determine (23). Endometriosis can present as painful masses or chronic pelvic pain during the menstrual cycle. Endometriosis in the inguinal region is rarely seen, but typically arises in women ranging from 22-46 years of age with a groin lump, with incidence peaking at the age of 30-40 years (24). Endometriosis in the inguinal hernia sac was detected in a single 37-year-old female patient and was categorized as an unexpected pathological finding.

Ectopic adrenal tissue (EAT) is a benign lesion associated with a defect in embryological development (25). Although this lesion cannot be detected in a routine clinical examination, it can be found during surgical intervention and in histological sections. EATs typically appear in a retroperitoneal area extending from the diaphragm to the pelvis and are mostly seen close to gonads. However, these can be seen in the adrenal, kidney, celiac plexus, spermatic cord, testis, and ovarian regions as well (26). In the ectopic adrenal cortex (EAC) pediatric group, variable incidences ranging from 1% to 9.3% have been reported in different studies, while a clear incidence rate has not been defined in adults. It has been reported that EAC is detected in 1.7% of patients under 15 years of age who underwent inguinal exploration (due to inguinal hernia, hydrocele, or undescended testis) (27). EAC was detected in the inguinal hernia sac in our 2 (0.4%) patients. These patients had no clinical findings detected preoperatively or intraoperatively and were categorized as unexpected pathological findings.

Pseudo epitheliomatous hyperplasia (PEH) is a reactive proliferation of mucosal and cutaneous surface epithelium. Differential diagnosis from squamous cell carcinoma can be difficult, though immuno histochemical dyes can help in diagnosis (28). During wound healing, PEH can be observed in post-resection, infectious, inflammatory, and degenerative diseases. In this disease, excessive proliferation of epithelial elements and growth of chronic granulomatous mesoderm are thought to occur simultaneously (29). In one (0.2%) patient, the hernia sac with the skin was excised due to skin ulcers accompanied by incarcerated umbilical hernia. As a result of pathology, it was reported as PEH on the skin and categorized as an unexpected pathological finding.

Although the rate of detecting metastatic carcinoma in hernia sac specimens is low, pathological examination can provide the first diagnosis in malignancy. In a study in which a pathological examination of the hernia sac was performed, metastatic carcinoma was detected in 0.4% of cases, and in three of these was reported as the first diagnosis (30). Studies have also reported that most hernia sac pathology results are benign but do report malignancy and metastasis in inguinal and abdominal hernia sac pathology (1,4). No malignant findings were found in the pathology of 437 hernia sacs examined in our study, and expected pathologies accounted for 98.9% of the results. Unexpected pathological findings constituted 1.1% of the cases, a low rate consistent with the literature. In addition, as the use of minimally invasive techniques has increased, the literature has not documented a parallel increase in the rate of hernia sac malignancies. In this study, we believe that the low rate of abnormal findings and the complete absence of malignancies may be related to the absence of pediatric patients and the low number of cases.

CONCLUSION

In our study, no evidence of malignancy was found in hernia sac specimens, and all unexpected findings were benign. For this reason, we think that microscopic examination of adult hernia sac specimens, other than those that cannot be clearly demonstrated to be benign macroscopically, unnecessarily increases the workload and cost. Despite these results, we still perform the routine histopathological examination of hernia sac in our clinic due to medicolegal reasons.

Competing Interests: The authors declare that they have no competing interest.

Financial Disclosure: There are no financial supports.

Ethical Approval: This study was approved by the Gaziantep University Ethical Community (2020/175) and registered in an international database (ClinicalTrials.gov NCT 04383249).

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