Paraumbilical Hernia containing Appendiceal Inflammation: A Systematic Review

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INTRODUCTION:
An abnormal protrusion of an organ or fatty tissue through the wall of the cavity in which it normally resides is known as a hernia.1 Hernia comes in several types, including groin, hiatus, incisional, and umbilical or paraumbilical.2 Umbilical or paraumbilical hernia rarely contains metastatic deposits and vermiform appendix. The usual contents include omentum and bowel loops3,4,5,6. However, doubtful contents become challenging to diagnose particularly when they imitate strangulated umbilical hernia.7 Appendicitis is the most common reason for hospital emergency surgery. Its incidence is slightly lower in females as compared to males.8 Inguinal and femoral hernia refers to appendicitis in the hernia sac. A few cases were reported in

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ABSTRACT

Background
Usually umbilical hernia contains bowel loops and omentum. The diagnosis becomes even more challenging when they imitate strangulated umbilical hernia. An acutely inflamed appendix has been seen in the femoral and inguinal hernia but is rarely found in the paraumbilical hernia.

Objectives
To observe the symptoms, findings, and treatment process of cases of umbilical/paraumbilical hernia in past literature and document a case report in the appendix within the paraumbilical hernia.

Methods
Literature has been searched with keywords and statements of umbilical hernia, appendix within the umbilical hernia, and paraumbilical hernia. Studies on appendix within paraumbilical hernia are scarce in the literature. Six studies from the past 12 years were included.

Results
There were six studies included. Pain, fever, vomiting, and swelling on the umbilicus were the common symptoms. No postoperative complication was seen.

Conclusion
Several factors can be responsible for umbilical hernia. A case report of a 50-years old male presented to Jinnah Hospital, Lahore with pain and umbilical swelling. Appendiceal inflammation was found in the hernia sac. Umbilical herniorrhaphy and appendectomy were done.

Keywords
Umbilical hernia; appendicitis, hernia; appendectomy; herniorrhaphy.
the literature that highlighted appendicitis within the umbilical hernia. Surgery is the only absolute treatment for appendicitis and strangulated hernia\(^9\). Appendicitis in the paraumbilical hernia is rarely found in the literature\(^7,10,11\). The cause of rareness might be that appendix is rarely found in proximity to the umbilicus.

The symptoms of acute appendicitis are vomiting, anorexia, and center to right iliac fossa abdominal pain in relation to the anatomical space of the appendix from developmental stages\(^9\). The incidence of appendicitis within a paraumbilical hernia is still unknown\(^9\). The incidence of umbilical hernia is 23% to 50% in the US population with females at more risk\(^12\). More than 0.5 million emergency operations were performed from 2001 to 2010 in the US\(^13\).

An umbilical hernia is the faulty median line abdominal wall from 3cm below and above the umbilicus\(^14\). Umbilical hernia can be acquired or congenital and found in adults and children\(^15\). About 10% of all wall hernias are found as umbilical hernias with a prevalence rate is approximately 2% in adults\(^16,17\). Several factors such as ascites, obesity, gender, multiple pregnancy, strain while lifting heavy objects and persistent cough can be responsible for umbilical hernia or paraumbilical hernia\(^18\).

Appendicitis in the hernia sac is often assumed an extrinsic compression directed toward partial ischemia\(^19\). CT scan report may be useful in identifying appendicitis in hernia.

Umbilical hernia can develop in children and adults\(^18\). It can become serious over time if not treated. Surgery may be proposed for children or may be suggested to wait for age 3-4 years because surgery isn’t necessary as the probability of complications is very low\(^18\). Quite opposed to that, the operation is suggested for adults as the chance of developing complications such as obstruction and strangulation is high\(^19\). Hernia is unexpected to get better among adults by itself. Operation is a way to get rid of and stop major complications. There is also a chance of hernia recurrence after repair\(^18\).

**Methodology**

Many different statements and keywords such as appendix within umbilical/paraumbilical hernia were used to collect literature. Studies included the past twelve years. Four studies were taken from the last five years. Geographical regions were not taken into consideration while selecting relevant literature.

The past medical history, symptoms of the disease, findings, postoperative complications (if any), and follow-up after the treatment were given in most of the case studies. These parameters were successfully documented in Table 1. A case study of the appendix within a paraumbilical hernia was also reported.

**Case Study**

A 50-years old male presented to the emergency of Jinnah Hospital Lahore, Pakistan with a 5-day history of umbilical swelling and increased pain from the past 4 hours. Physical examination revealed pulse 81/min, Bp 140/90 mm/hg, respiratory rate 18/min, and temperature 98.6 F°. Body weight was observed as 100kg. The patient was a smoker. No symptoms such as cough, constipation, fever, nausea, vomiting, and weight loss were found. The patient had a past history of hypertension. Painful and non-reducible paraumbilical; swelling (10x10 cm) with positive cough impulse was noted on abdominal examination.

Ultrasound abdomen and abdominal X-ray were suggested at the initial stage of diagnosis. Strangulated paraumbilical hernia diagnosis was revealed with a (4x4 cm) hernia sac originating from the umbilical containing content of omentum and appendix where omentum content was ischemic. During the surgery sac was opened from the neck and an appendectomy and omentectomy were performed. Simple Mayo’s repair was done.

**Discussion**

The location of the appendix is variable but the most common location is retrocecal. However, its base is found at cecum\(^25\). Appendix in hernia sac is linked with the anatomical variations in size, position, mobile or large cecum\(^26\). Appendectomy is the standard care of the appendix without perforation\(^25\). It is not unusual to find appendicitis in an external hernia i.e., inguinal or femoral hernia. Appendicitis within an umbilical hernia is comparatively rarer than appendicitis within a femoral or inguinal AMYAND hernia\(^20\). In other studies, included in the current review, four cases of appendicitis within umbilical hernia are found in the literature\(^4,27\), and a case of left-sided Amyand’s hernia with obstruction was seen\(^28\).

Rayan reported 13% as the prevalence rate of appendicitis within hernia out of total hernia cases\(^29,30\). Appendiceal inflammation inside the hernial sac is a condition that is generally an extrinsic compression...
The common diagnosis found in literature is strangulated umbilical hernia. In the currently reported case study, the strangulated paraumbilical hernia is the usual diagnosis. Postoperative complications could not be compared due to variations in follow-up time and measurement methods.

Simple suturing of defects, Mayo’s repair, or mesh hernioplasty are choices in adults while the area is closed with stitches in children instead. The patient may experience discomfort or anxiety while recovering. There may be several complications of the surgery such as the belly button looks different, rupture or infection of the wound, or may discharge yellow or it may appear as swollen or red. Pain can also be a complication.

**CONCLUSION**

Past literature has been searched for an appendix within an umbilical/paraumbilical hernia. Six studies from the past twelve years are included and the patient’s age, medical history, symptoms, findings, treatment, postoperative complications, and follow-up has been observed. The major finding was appendix within umbilical/paraumbilical hernia in observed literature cases and its importance lies in its look, like a strangulated hernia. So, it is concluded that appendicitis within the umbilical hernia has been observed as rare.

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**Conflict of Interest:** None

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**Table 1: List of case Studies included in the Review**

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Age</th>
<th>Gender</th>
<th>Past Medical History</th>
<th>Symptoms</th>
<th>Findings</th>
<th>Post-operative Complications</th>
<th>Follow-up After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atabek22 (2008)</td>
<td>25 days</td>
<td>Male</td>
<td>No</td>
<td>Fever, Vomiting</td>
<td>Bilateral inguinal hernia soft tissue mass within umbilical hernia. Appendicitis within umbilical hernia.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Agarwal et al.20, (2013)</td>
<td>54 years</td>
<td>Female</td>
<td>No</td>
<td>Severe pain, Vomiting</td>
<td>Appendiceal inflammation inside hernia sac, Strangulated paraumbilical hernia,</td>
<td>No</td>
<td>-</td>
</tr>
<tr>
<td>Wani et al.23, (2016)</td>
<td>1 year</td>
<td>Female</td>
<td>No</td>
<td>Fever, Vomiting</td>
<td>Appendix has perforated in umbilical hernia in abdominal wall</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Kordzade24 (2017)</td>
<td>84 years</td>
<td>Female</td>
<td>Hypertension, Ischemic heart disease, congestive heart failure, hypercholesterolemia</td>
<td>Abdominal pain, Nausea</td>
<td>Treated successfully for acute appendicitis within paraumbilical hernia</td>
<td>No</td>
<td>6-months follow-up</td>
</tr>
<tr>
<td>Zormpa24 (2019)</td>
<td>30 years</td>
<td>Female</td>
<td>No</td>
<td>Abdominal pain, Vomiting, lump on the umbilicus</td>
<td>Incarcerated paraumbilical hernia.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Kevin25 (2020)</td>
<td>57 years</td>
<td>Male</td>
<td>No</td>
<td>Pain at hernia, Fever, Nausea, Vomiting, Diarrhea, Constipation, Urinary changes.</td>
<td>Abdomen was soft, obese. Large umbilical hernia, Appendicitis within paraumbilical hernia</td>
<td>No</td>
<td>3-days hospital stay.</td>
</tr>
</tbody>
</table>
Figure 1: Appendicitis and caecum in an opened hernial sac of the paraumbilical hernia

Reference:


2. Lockhart K, Dunn D, Teo S, Ng JY, Dhillon M, Teo E, van Driel ML. Mesh versus non-mesh for inguinal and femoral hernia repair. Cochrane Database of Systematic Reviews. 2018(9).


