Retained Surgical Textilomas Occur More Often during War

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Retained surgical textile foreign bodies are a problem despite precautions taken by surgeons. Computed tomography (CT) is a method of choice in diagnosing the cases of retained textilomas. Over 12 years, we diagnosed 11 acute textilomas in 10 patients in the early postoperative period within 3 months after abdominal surgery. The presence of considerable amount of air bubbles within textile fibers was the most representative sign. A 3-10 mm wide peripheral rim was present in all textilomas. In additional 3 cases, chronic, encapsulated foreign body granulomas were found, two were mimicking renal neoplasms. All granulomas contained discrete or coarse calcifications. The period between surgery and CT diagnosis was from 6 months to 14 years in chronic lesions. It is important to emphasize that 9 textiloma in 8 patients were associated with the years of war in Croatia (1991 and 1992), in hospitals on battlefronts, where surgeons worked under extremely strenuous conditions and with great inflow of wounded soldiers and civilians.

Key words: computed tomography; surgery; surgical sponges; war

Although infrequent, retained foreign bodies following abdominal surgery are still observed, despite precautions taken by surgeons (1,2). Under normal circumstances, the incidence of retained foreign bodies has been estimated at 1 per 1,000-1,500 laparotomies (1). There are two types of retained surgical textilomas, acute and chronic. In acute textilomas, the exudative reaction predominates, with a tendency to form abscesses (3) and fistulas to the skin (4). The chronic form is characterized by well encapsulated aseptic foreign body granuloma with no symptoms or nonspecific subjective symptoms (5,6). Diagnosis is often difficult in both forms of retained textilomas. The complication rate is high and complications are bizarre, including abscesses and erosions into gastrointestinal tract (7). It is necessary to recognize retained textilomas soon after surgery, although this may be difficult because of their inconsistent appearance, resemblance to colon contents, and tendency to mimic abscess formation and lack of radiopaque marker within surgical sponges in most cases. Mistakes occur even in the presence of radiopaque marker (8-10).

Patients and Methods

Patients

Thirteen patients underwent CT evaluation for nonspecific abdominal pain. Two female and eight male patients were referred for CT evaluation of the abdomen in early postoperative period for nonspecific abdominal symptoms, poor recovery, septic condition, or general malaise. The abdominal surgery in 8 male patients had been performed for multiple shrapnel or bullet penetration wounds one week to one month prior to CT examination. In this group, 9 acute textilomas have been found. In 2 female patients, acute textilomas were detected after appendectomy and hysterectomy. Chronic retained textilomas were found in the late postoperative period in 3 male patients after orchydecotomy, lymphadenectomy, and splenectomy, respectively. The time lapse between the surgery and diagnosis of retained foreign body granuloma was 6 months after splenectomy and 3 and 14 years after orchydecotomy with lymphadenectomy, respectively.

Methods

Abdominal computed tomography (CT) was performed in all cases (Siemens DRH, Erlangen, Germany; Shimadzu, Kyoto, Japan). Six patients with acute abdominal symptoms were given oral contrast media. Other patients were too weak or were vomiting and the application of contrast medium was not possible. In a single case of chronic foreign body granuloma, intravenous contrast medium was administrated.

Results

Over 12 years, 11 acute form of retained textilomas and three chronic foreign body granulomata were identified in thirteen patients (Table 1).

During the 1991-1992 war period, 9 cases of acute form of retained sponges were found a week to a month following surgery in war hospitals. In 6 of them, abscess have formed. In one patient 2 textilomas were found. In other 2 cases, exudative form of textiloma was detected after hysterectomy and appendectomy. In all cases, acute textilomas resulted in a spongiform appearance. There was a considerable amount of air trapped between textile fibers. (Figs. 1-4). However, in 3 cases, only a small amount of trapped air was found (Figs. 5 and 6). Entrapped air bubbles were the most characteristic and sensitive sign. The peripheral capsule 3-10 mm wide was pres-
In all cases. In 4 cases, the rim was hyperdense, due to blood-soaked textile, measuring up to 80 HU. In a patient, the very thin rim was encircling large amount of air bubbles, mimicking adjacent colon filled with contents.

In 3 patients, well encapsulated foreign body granulomas (gossypibomas) with discrete calcifications in a single case and coarse calcifications in 2 other cases were found, mimicking renal tumors. In both cases, the "renal mass" was an accidental finding. In the first case, CT confirmed a well defined, rounded mass 3 cm in diameter, arising from the anterior aspect of the right kidney (Fig. 7). The mass demonstrated solid density, with multiple coarse calcifications. In the second case, CT revealed a rounded mass approximately 4 cm in diameter, adjacent to dorsal surface of lower pole of the kidney (Fig. 8). On the non-enhanced CT scans, the mass was of heterogeneous density, partly similar to the density of renal parenchyma but with hypodense areas mimicking necrosis within the tumor. Central and peripheral coarse calcifications were demonstrated. The lesion did not enhance after intravenous administration of contrast medium, contrary to renal neoplasm. In both cases no signs of extra capsular infiltration or lymphadenopathy were detected. In the third case, CT examination 6 months after splenectomy revealed nodular, solid mass in the left upper abdomen, 5 cm in diameter (Fig. 9). In all 3 cases a foreign body granulomata were surgically confirmed.

**Discussion**

The radiologic presentation of retained surgical foreign bodies, as well as their clinical implications, are well known but are still a matter of interest even as case reports (2,5,14). Computed tomography is the method of choice for the detection and location of retained foreign bodies, and diagnosing of complications.

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**Table 1. Patient data and computed tomography (CT) findings in 13 patients with 14 retained surgical textilomas**

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age/sex</th>
<th>Surgical intervention</th>
<th>Duration</th>
<th>Symptoms</th>
<th>CT finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19/M</td>
<td>sutures of liver, shrapnel extraction</td>
<td>10 days</td>
<td>poor recovery, fever, septic condition</td>
<td>oval mass dorsal to the liver dome; wide hyperdense rim, small air bubbles</td>
</tr>
<tr>
<td>2</td>
<td>31/M</td>
<td>sutures of hepatic flexure of colon for penetrating wound</td>
<td>3 weeks</td>
<td>general malaise, fever</td>
<td>2 complex mass lesions, one 4 cm in diameter, lateral to the right liver lobe; the other 6 cm in diameter, in front of the right kidney, entrapped air bubbles</td>
</tr>
<tr>
<td>3</td>
<td>22/M</td>
<td>resection of small intestine, left hemicolecotomy, splenectomy for penetrating wounds</td>
<td>5 days</td>
<td>general malaise, fever</td>
<td>subphrenically located mass, 10 cm in diameter, huge amount of trapped gas; hyperdense peripheral rim; penetration of abdominal acesobs into the thoracic wall</td>
</tr>
<tr>
<td>4</td>
<td>27/M</td>
<td>multiple shrapnel abdominal injuries</td>
<td>18 days</td>
<td>epigastric discomfort, fever</td>
<td>heterogeneous mass containing gas bubbles, 8 cm in diameter; impression of the dorsal wall of stomach</td>
</tr>
<tr>
<td>5</td>
<td>31/M</td>
<td>sanation of multiple shrapnel wounds</td>
<td>1 month</td>
<td>dumb pain in the right lower abdomen</td>
<td>mass with a thin rim separated from the ascending colon, large amount of air bubbles; mimicking colon content</td>
</tr>
<tr>
<td>6</td>
<td>23/M</td>
<td>splenectomy for blast trauma</td>
<td>1 week</td>
<td>general malaise, fever, chills</td>
<td>mass with liquid content, massive gas bubbles</td>
</tr>
<tr>
<td>7</td>
<td>36/M</td>
<td>multiple shrapnel wounds of abdomen</td>
<td>10 days</td>
<td>general malaise, fever, chills</td>
<td>mass with a 1 cm wide rim, containing gas bubbles; discrete inflammatory reaction of the surrounding fat tissue</td>
</tr>
<tr>
<td>8</td>
<td>32/M</td>
<td>resection of small intestine for bullet wounds</td>
<td>3 weeks</td>
<td>diffuse abdominal pain</td>
<td>&quot;solid&quot; mass lesion 4 cm in diameter, in the middle portion of the left abdomen, with small gas bubbles inhomogeneous mass, 4 cm in diameter, with micro bubbles</td>
</tr>
<tr>
<td>9</td>
<td>38/F</td>
<td>appendectomy</td>
<td>3 weeks</td>
<td>tenderness in the right lower abdomen, fever, operative wound secretion</td>
<td>nodule, 2 cm in diameter, in the left lower abdomen, with gas bubbles</td>
</tr>
<tr>
<td>10</td>
<td>59/F</td>
<td>hysterecotomy for uterine myomatosis</td>
<td>3 months</td>
<td>palpable mass in suprapubic region, pelvic discomfort, subdural</td>
<td>mass lesion in the ventral pelvis, with air trapping and liquid content</td>
</tr>
<tr>
<td>11</td>
<td>27/M</td>
<td>splenectomy for trauma after motor vehicle accident</td>
<td>6 months</td>
<td>follow up</td>
<td>round, well defined &quot;solid&quot; mass in the spleen compartment, with coarse calcifications</td>
</tr>
<tr>
<td>12</td>
<td>30/M</td>
<td>Left side orchidectomy and lymphadenectomy for testicular tumor</td>
<td>3 years</td>
<td>incidental finding</td>
<td>complex, well defined mass, adherent to the anterior surface of the left kidney, 3 cm in diameter, numerous pale calcifications</td>
</tr>
<tr>
<td>13</td>
<td>61/M</td>
<td>right side orchidectomy and lymphadenectomy</td>
<td>14 years</td>
<td>tension in the right lumbar region</td>
<td>mass lesion adherent to dorsal surface of the right kidney, of heterogeneous density, with coarse calcifications; no contrast enhancement after IV administration of contrast medium</td>
</tr>
</tbody>
</table>

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**Figure 1. Case 1:** CT scans obtained 10 days after surgery for liver sutures and shrapnel extraction. An oval mass dorsal to the liver dome contained a small amount of air bubbles. Wide hyperdense peripheral rim (arrow).
Figure 2. Case 3: Splenectomy, resection of small intestine, and left hemicolecction have been performed for penetrating wounds 5 days prior CT examination. (A, B) Subphrenically located mass 10 cm in diameter, containing huge amount of trapped air (arrow). Hyperdense peripheral rim. Penetration of the abdominal abscess into thoracic wall (arrowhead in A).

Figure 3. Case 4: Impression of the dorsal wall of stomach with a round mass of heterogeneous content and air bubbles, 8 cm in diameter (arrow).

Figure 4. Case 7: CT obtained 10 days after the extraction of multiple shrapnels from the abdominal wounds. Mass in the left abdomen, containing gas bubbles, 1 cm wide rim, and discrete reaction of surrounding fat tissue (arrow).

Figure 5. Case 8: Resection of the small bowel for bullet wounds 3 weeks prior CT examination. In the middle portion of the left abdomen, “solid” mass lesion is seen with a small amount of air bubbles (arrow).

Figure 6. Case 10: Hysterectomy for uterine myomatosis 3 months prior CT examination. Huge mass anterior in pelvic region measuring 10 cm to 14 cm, with air trapping and liquid content (arrow).
The 14 cases of retained surgical textilomas in our study illustrate the broad spectrum and variable appearance of acute and chronic forms of retained foreign bodies. The occurrence of 9 cases of acute retained foreign bodies in a short time period (1991-1992) was the consequence of great number of cau-
salities during the war in Croatia (11,12). The hospi-
tals near battle lines were flooded with wounded sol-
diers and civilians. For example, in one of the hospi-
tals in a war region, the number of wounded persons in a six-month period in 1991 was 1,347. During 1992, the number increased to 5,678, with an aver-
age of 900 per month (from May until September 1992). Operating rooms were moved to the cellars of the hospitals (11,12). The limitations imposed by war, dictat-
ed the management of patients and caused pos-
sible mistakes during surgery. Severe and compli-
cated cases were transported to larger hospitals, inclu-
ding our hospital.

In the majority of acute textilomas we found a large amount of trapped air, which was the most accu-
rate sign to establish the diagnosis. The previously held opinion that air bubbles were uncommon within textilomas (6,9,13) was not consistent with our obser-
vations. Radiopaque markers incorporated in surgical
sponges have not solved the problem of retained textilomas completely. Markers may resemble surgical clips which may lead to misinterpretation (10). In several reported cases, the radiopaque marker was misinterpreted for intestinal contrast content, calcification, or hydatid cyst (15, 16). The second sponge count is obligatory before skin closure has begun (10, 13).

Chronic retained sponge with granulomatous formation may mimic a tumor (5). The presence of focal, discrete, or coarse calcifications is more common in the chronic form of retained textilomas (5, 6, 16). Contrary to renal neoplasm, there is no post-contrast opacification of foreign mass. Suspicion should arise of encapsulated retained textilomas in each case when operation has been performed prior to the discovery of “tumor”, unusual by its appearance or location.

References

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