



Pathology & Biology Section – 2005

G8 A Fatal Case Due to Abdominal Compartment Syndrome (ACS)

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The goal of this presentation is to present to the forensic community a case of death due to a rare systemic syndrome: abdominal compartment syndrome (ACS).

This presentation will impact the forensic community and/or humanity by presenting a case worthy of reporting for the rareness of the syndrome and its great surgical and forensic interest.

This case has been studied by means of autopsy and histological examinations.

Abdominal compartment syndrome (ACS) is broadly defined as organ dysfunction derived from increase in intra-abdominal pressure. Prolonged, unrelieved increased intra-abdominal pressure at more than 20 mm Hg can produce pulmonary compromise, renal impairment, cardiac failure, shock, and death. This presentation discusses the clinical-pathologic features, the postmortem findings and microscopic features of a fatal case due to ACS.

Case Report: A 35-year-old Caucasian female went to the emergency room with increasing abdominal pain. The woman, admitted to the surgery unit, underwent a physical examination. It showed a sharply distended and painful abdomen, no peristalsis, and rebound tenderness. At abdominal ultrasonography, stomach and bowel loops appeared distended with corpuscolated liquid material. Abdominal x-ray showed small bowel distended with air-fluid levels. Three years before, the woman had undergone an appendectomy. She was taken into the operating room for intestinal occlusion due to adhesions. On the first postoperative day, the patient had shock with numbness, cutaneous pallor, sweating, cutaneous marbling on upper and lower limbs, tachycardia, tachypnea, peripheral pulselessness, oliguria, and severe metabolic acidosis. After another day of continuous deterioration of her clinical condition, she was moved to the Intensive Care Unit. Her abdomen seemed distended, with no peristalsis; CT-scan confirmed bowel distention due to fluid and gas, with perihepatic and perisplenic fluid collections. Laboratory tests demonstrated leukopenia, neutropenia, and metabolic acidosis. Gynecologic examination revealed a rectocele. On the second day in the Intensive Care Unit the woman continued to get worse. She had anuria and hypotension; her intra-abdominal pressure, measured inside the urinary bladder by means of an ordinary Foley catheter, was 35 cm H₂O. Taken into the operating room for surgical abdominal decompression, the woman died. A complete autopsy was performed 48 h after death.

At autopsy the body was that of a well-developed adult with pale and dehydrated skin, ostia, and oral and scleral mucosae. The brain was congested and edematous. The left pleural cavity contained 200 ml of red liquid; the right pleural cavity contained 400 ml of the same liquid. The lungs were hypoexpanded and atelectatic. The peritoneal cavity contained 1000 ml of red liquid. The intestines appeared distended, with brown liquid material and pseudomenbranes in the large bowel. Examination of other organs was unremarkable.

The histological findings of the liver revealed necrosis in acinar zone 3. The kidney showed characteristics of shock: collapse, swellings of endothelial and surface cells, broadening of the basal membrane, and impairment of the loops in the glomeruli. The epithelia of tubules were flattened, and their nuclei were enlarged. The bowel wall showed areas of epithelial necrosis, fibrinous stratification, and inflammatory infiltration spread up to the muscularis mucosae.

It was concluded that the cause of death was fatal shock due to Abdominal Compartment Syndrome (ACS).

ACS is a clinical syndrome that occurs as a consequence of intraabdominal hypertension. ACS is characterized by a tensely distended abdomen, elevated peak airway pressure, and impairment of cardiac and renal functions, leading to oliguria or anuria. Any insult that causes an acute increase in intra-abdominal volume can trigger ACS, including trauma to the abdomen as well as to distant sites, pancreatitis, hemorrhage, intestinal occlusion, ruptured abdominal aortic aneurysm, massive fluid resuscitation, and burns. The syndrome usually occurs in critically sick patients after major abdominal trauma or operations. Several cases were described where the syndrome developed without direct abdominal insult. These cases, however, were associated with severe hemorrhagic shock, burns, massive ascites, ileus, ovarian mass, or the use of anti-shock trousers.

According to clinical symptoms and measuring of intra-abdominal pressure, it is possible to make a timely diagnosis of ACS and operate for a prompt abdominal decompression. Clinical studies show a significant difference in mortality between ACS patients undergoing abdominal decompression and untreated patients (59% vs 100%). Further studies point out that a timely abdominal decompression and early treatment reduce both the incidence of ACS (64% vs 43%) and mortality of ACS (44% vs 28%) in



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patients at risk.

Abdominal Compartment Syndrome, Histological Findings, Postmortem Diagnosis