

# Intracranial Hypertension Secondary to Abdominal Compartment Syndrome in a Girl with Giant Ovarian Cystic Mass

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**Abstract** The abdominal compartment syndrome (ACS) is a potentially fatal entity that occurs as a result of an acute increase in intra-abdominal pressure (IAP). The authors report on a girl with a giant ovarian cystic mass, and clinical signs of ACS and intracranial hypertension (IH). The possible mechanism of IH secondary to ACS is discussed

**Keywords** Intracranial hypertension · Abdominal compartment syndrome · Giant ovarian mass · Children

## Introduction

The term abdominal compartment syndrome (ACS) comprises the adverse physiologic consequences that occur as a result of an acute increase in intra-abdominal pressure (IAP). These alterations involve mainly the cardiac, pulmonary, renal, and splanchnic function [1]. However, a relationship between increased IAP and intracranial hypertension (IH) has also been demonstrated in animal models [2], head trauma patients [3], and human subjects following laparoscopic surgery [4].

ACS from a giant ovarian tumour has only been reported in adult literature [5, 6]. In this study the authors present a case of ACS secondary to a giant ovarian mass causing increased IH in a young girl.

## Case Report

A 10-y-old girl presented to the Emergency Department with frontal headache, agitation, blurred vision, vomiting, mild respiratory distress, and oliguria. Her past history revealed gradual abdominal distension since the last month along with intermittent abdominal pain and constipation. On examination, a huge abdominal mass extending from the pelvis to the xiphisternum was found. Insertion of a Foley catheter yielded only 20 ml of urine. Femoral artery pulse was weak but without cyanosis of the lower extremities. The assessment of visual fields revealed papilledema of both optic discs, and edema of the left macula. The rest of neurologic examination was normal. A chest radiograph showed decreased lung fields and marked elevation of the diaphragm. Computed tomography image of the brain was normal. Ultrasound and magnetic resonance imaging showed a giant mass extending from the pelvis to the diaphragm. The mass compressed the inferior vena cava, the bowel and the kidneys. At this point, a hypothesis of an acute increase in IAP resulting in elevated IH was made. To confirm that the intravesical pressure was measured through the Foley catheter. A pressure of 30 cm H<sub>2</sub>O confirmed the markedly increased IAP. At laparotomy a cystic mass emerging from the right ovary was found. The mass was completely excised along with the ipsilateral ovary and the salpinx t. The uterus and the left ovary appeared normal. Biopsies from the omentum and free fluid from the peritoneal cavity were taken for investigation. Postoperatively, her headache improved significantly and she had a gradual improvement in the visual fields without defects after 10 wk.

The specimen measured 26 cm in maximum dimension and weighed 4.850 kg (Fig. 1). Histological examination showed grade I ovarian teratoma. Cytological examination of the peritoneal fluid and histology of the omentum were normal.

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**Fig. 1** The removed ovarian teratoma

## Discussion

The term ACS was introduced in 1989 by Fietsam et al, to denominate the pathophysiological effects of increased IAP [7]. Pediatric surgeons were among the first who have observed multisystem organ failure associated with increased IAP and developed the prosthetic silo technique for gradual reduction of abdominal viscera in abdominal wall defects [8].

ACS is characterized by a tensely distended abdomen, inability to palpate the femoral pulses, cyanosis of the lower extremities, hypoxia due to increasing airway pressures and oliguria [9]. The diagnosis is commonly made by measuring the bladder pressure [8]. A pressure level of 20–34 cm H<sub>2</sub>O, is a strong indication for abdominal decompression [8].

The relationship between increased IAP and IH is not well understood. Bloomfield et al [2] in an animal model showed that an acutely increased IAP produced a significant IH. These authors also reported the successful management of a patient with severe multisystem injury in whom abdominal decompression reduced dramatically high IH unresponsive to medical measures. Further support comes from Cooke et al [4] who reported a significant increase in the incidence of headache and nausea in human subjects undergoing laparoscopic operations as compared with open procedures in the control group. He suggested that mechanical effect of increased IAP reduces venous drainage from the head. This, in turn leads to increased inferior vena cava pressure and decreased lumbar plexus outflow [4]. Because the veins and dural sinuses in the cranium are connected to the great vessels in the neck and thorax, any changes in venous pressure can be transmitted directly to the brain [5].

The present case didn't fulfil all the above mentioned criteria of ACS [9]. Nevertheless, the presence of a markedly

distended abdomen, along with respiratory distress, oliguria, and diminished femoral pulses, posed the suspicion of ACS. One might anticipate that an accompanying measurement of intracranial pressure should be performed. However, given that the patient was, conscious, and without evidence of deterioration, the authors were reluctant of that. This decision is in accordance to guidelines extracted from pediatric head injury patients, which do not support the routine use of intracranial pressure monitoring [10].

This present case showed that a giant ovarian teratoma could result in ACS with subsequent IH. The authors recommend a high level of suspicion in children with signs of ACS even if they are not fully expressed. The relationship, between ACS and IH needs further investigation to be elucidated.

**Conflict of Interest** None.

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