



Anaphylactic and Hemorrhagic Shock during Disseminated Abdominal Hydatidosis Surgery: A Case Report

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Abstract

Hydatidosis is a frequent pathology which remains endemic in Morocco. Its preferred location is the liver while the peritoneal location remains rare, even more rarely the pelvic location. The treatment is mainly surgical, but this surgery can be complicated (intraoperatively) by potentially serious accidents, it can be implicated in the occurrence of severe allergic reactions which can be life-threatening, more rarely by hemorrhagic accidents, especially if the cysts keep important and close vascular contact. We report the observation of a case of disseminated peritoneal hydatidosis supra-mesocolic, sub-mesocolic, pelvic and hepatic surgery complicated first by anaphylactic shock and secondarily by hemorrhagic shock. We insist on the need for its rapid recognition in order to quickly institute an adequate and effective treatment. The prevention of this accident is based on surgical precautions to prevent leaks or accidental intraoperative ruptures of hydatid cysts.

Keywords: disseminated abdominal hydatidosis; hydatid cyst; anaphylactic shock; hemorrhagic shock; ETCO₂

Introduction

Hydatid cyst or hydatidosis is a pathology caused by the larvae of the tænia *Echinococcus granulosus*. It is endemic in Morocco, poses a major public health problem and causes huge economic losses.

Infestation via the digestive tract and the mainly portal progression of embryos explain the hepatic localization in 80% of cases [1], while the peritoneal localization is exceptional, most often occurring by cracking or rupture of a hydatid cyst of the liver.

Surgery for hydatid cysts can be complicated intraoperatively by potentially serious accidents.

In this case, we report a case of multiple hydatidosis surgery complicated by severe anaphylactic and hemorrhagic shock.

Observation

Patient presentation

Our patient was a 32-year-old woman, with no pathological history to note, in particular no known allergy or atopy, who presents for surgery for peritoneal and hepatic hydatidosis which has been progressing for 2 years.

Clinical results

The preoperative clinical examination reports diffuse abdominal distension and tenderness in a haemodynamically and respiratory stable afebrile patient, without accompanying signs.

Diagnostic procedure

The biological workup including a blood count, hemostasis tests and ionogram, does not report any particularity, chest x-ray is normal.

Abdomino-pelvic computed tomography (Figure 1) made it possible to suggest the diagnosis of peritoneal and hepatic hydatidosis by visualizing:

- Multivesicular masses not taking the contrast product of segments VII and VIII (10X12cm)
- Small cysts of the hepatic dome and segment VI partially filling the Morison space and coming into contact with the right kidney (between 13 and 40 mm in diameter)
- A 4 cm segment I cyst interposed between the portal trunk and the inferior vena cava
- Diffuse intra-abdominal cystic formations involving the whole of the peritoneal cavity, supra and submesocolic as well as the splenic and hepatic pedicle region, the left sub-diaphragmatic region and the pouch of Douglas, varying in size and appearance (the most voluminous is retro-umbilical measuring 10cm)

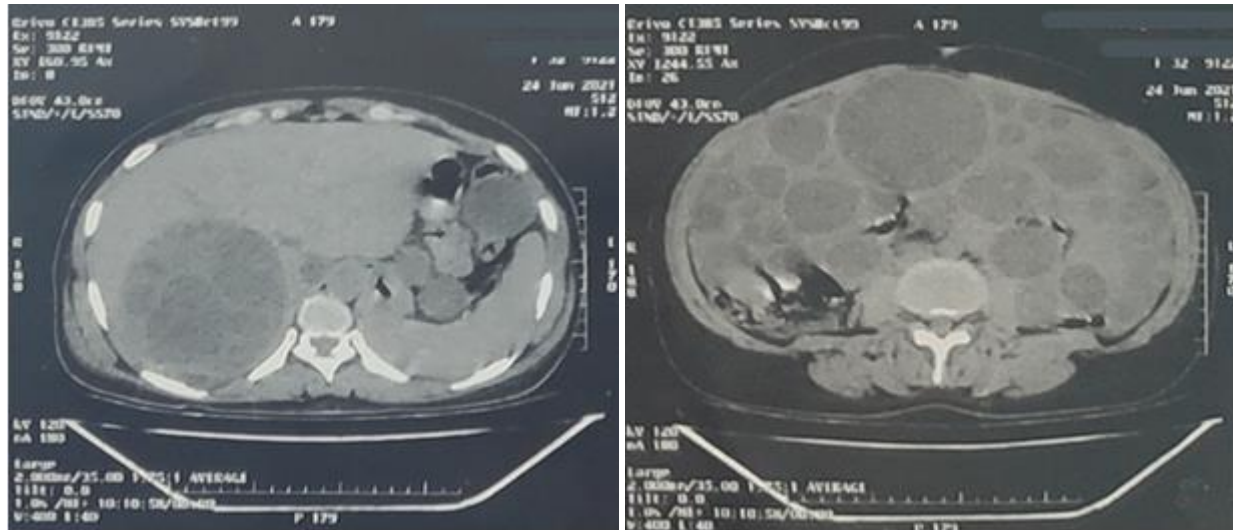


Figure 1: CT-scan appearance of hepatic and especially peritoneal hydatidosis involving all peritoneal recess as well as supra-mesocolic than sub-mesocolic up to the pouch of Douglas

The patient was categorized ASA I (patient in good health other than the condition requiring surgery according to the classification of the American Society of Anaesthesiology)

Therapeutic intervention

Premedication based on albendazole 400mg / d for four days

The procedure took place under balanced general anesthesia, in supine position, induction (after pre-oxygenation) with fentanyl, titrated propofol and rocuronium. Maintenance had been ensured by sevoflurane and fentanyl.

The surgical procedure consisted of resection of the various cysts (Figure 2) with washing with hydrogen peroxide, some cysts of the pouch of Douglas burst, with a decline in the hemodynamic state marked by the occurrence of episodes of mainly diastolic hypotension, the resuscitation measures consisted of volume expansion with 0.9% isotonic saline serum at a rate of 20 ml/kg twice associated with bolus of adrenaline of 100 µg followed by a continuous infusion of adrenaline via a central venous catheter given the persistence of the collapse, adapted to the blood pressure levels, and associated with a bolus of hydrocortisone hemisuccinate.



Figure 2: Operative part showing multiple cysts with their proligerous membranes and daughter vesicles

No skin signs observed but an increase in insufflation pressures was noted.

During resection of the cyst interposed between the inferior vena cava and the portal vein, an accidental vascular lesion of the portal vein has occurred, causing severe bleeding estimated at 2500 ml, responsible for a cardiovascular collapse with blood pressure numbers that reached 47/18mmhg, expired carbon dioxide (PETCO₂) measured at 8mmhg, subsequently saturation and the heart rate becomes impregnable, with coldness of extremities and discolored conjunctiva, the management consisted of a rapid volume expansion at a rate of 30 ml/kg with continuous increase in the dose of adrenaline in an electric syringe pump with an objective of 65mmhg of mean arterial blood pressure (MAP), then noradrenaline was added via the central venous catheter at a rate of 0.01 µg/kg/minute, then adapted according to the MAP values, in parallel the patient was rewarmed, ventilated with 100% oxygen, a massive transfusion was established rapidly with the transfusion of 4 red blood cell concentrates, 4 lots of fresh frozen plasma associated with a 2g of calcium infusion, hemostasis was ensured by the surgeon, and the transfusion was continued in intensive care.

Monitoring and results of therapeutic interventions

Patient extubated the same day in the intensive care unit, adrenaline and noradrenaline were gradually weaned down after 48 hours, then the patient was referred to the visceral surgery after a stay of four days and stabilization of the respiratory, neurological and hemodynamic state.

Informed consent

The patient was informed about this article, its purpose and the reason for her case was special. She has voluntarily given her informed consent to allow the authors to use this data for this case report.

Discussion

Hydatid peritoneal dissemination is exceptional, the frequency of disseminated peritoneal hydatidosis ranges between 1.4 and 9.4% [2], with a reported incidence of 0.2% to 0.9% in the pelvic location [3] our observation presents both diffuse peritoneal dissemination, supra-mesocolic, sub-mesocolic, pelvic and also hepatic intra-parenchymal.

Many accidents and intraoperative incidents during hydatidosis surgery can occur, mainly dominated by anaphylactic accidents and the risk of bleeding [4].

These anaphylactic reactions or anaphylactoids have variable and multiple clinical expressions, sudden onset and sometimes severe. The mechanism of these reactions is complex, it may be a type-1 hypersensitivity reaction linked to

immunoglobulins E or secondary to an activation of complement with anaphylatoxins release [5].

The most frequently reported initial clinical signs are no pulse, erythema, difficulty in ventilating, desaturation, or an unexplained drop in the tele-expiratory pressure of CO₂ (ETCO₂), the symptoms can have several grades of severity ranging from mucocutaneous signs, bronchospasm to cardiopulmonary arrest (Table 1).

Table 1: Grades of clinical severity of anaphylactic reaction according to Ring and Messmer [15]:

Severity grade	Symptoms
I	Generalized mucocutaneous signs: erythema, urticaria, with or without angioneurotic edema
II	Moderate multiple organ involvement, with mucocutaneous signs, unusual hypotension and tachycardia, bronchial hyperreactivity (cough, ventilating difficulty)
III	Severe multi-organ disease threatening life and requiring specific therapy: cardio-vascular collapse, tachycardia or bradycardia, cardiac arrhythmias, bronchospasm Skin signs may be absent or appear only after the rise in blood pressure Cardiocirculatory inefficiency
VI	Respiratory arrest
V	Death by failure of cardiopulmonary resuscitation

The mucocutaneous signs may be missing, their presence is not essential for the diagnosis, while the cardiovascular collapse can be inaugural. Whenever possible, the onset of a grade 3 reaction requires stopping the anesthesia and postponing the operation. The result of a rapid and adapted treatment is most often favorable but it remains fatal in 2% to 8% of cases [6].

Treatment is symptomatic, based on volume expansion and adrenaline, which has beta2 bronchodilator and alpha1 vasoconstrictor properties [7]. The Prevention of intraoperative anaphylactic accidents is mainly surgical involving careful handling of the cyst, emptying it before the injection of the scolicalid agent in order to avoid over distension and the risk of cystic rupture [8].

The incidence of haemorrhagic complications depends on the degree of destruction of the hepatic parenchyma, the nature of the surgical procedure (conservative or radical) and above all on the site of the cyst and its relationship with major vascular axes. Too extensive radical treatment can be the source of major life-threatening bleeding.

In our case, hydatid cysts spare significant and multiple vascular relationships, in particular the portal trunk, the inferior vena cava and the splenic pedicle.

These hemorrhagic accidents are sometimes unpredictable and require the establishment of a large-caliber venous catheter allowing volume expansion and rapid blood transfusion, eventually the establishment of a central venous line for vasoactive drugs. This serious complication can be seen after the puncture of the cyst which is at the origin of a detachment of the membranes which blocked the cysto-vascular breach.

The transfusion strategy in the operating room generally responds to a gradual approach, given the progressive blood loss [9], but the occurrence of sudden and massive bleeding with major hemodynamic repercussions, justifies the initiation of a massive transfusion, at the same time as performing a hemostasis procedure [9].

Norepinephrine is the vasopressor amine of choice in terms of hemorrhagic shock, it is an active sympathomimetic on alpha receptors, producing arterial vasoconstriction (directly increases blood pressure) and venoconstriction, especially in the splanchnic circulation, this causes a displacement of the venous blood volume towards the systemic circulation, increasing the circulating blood

volume in the central compartment, and maintaining blood flow to vital organs [10].

ETCO₂ is a comprehensive, reliable and accurate parameter with an earlier response time than the pulse oximeter. It is both respiratory and circulatory monitoring, correlated with cardiac output [11].

Hypothermia decreases thrombin generation and fibrinogen synthesis by dysfunction of coagulation factors, leads to platelet dysfunction and endothelial dysfunction, and increases fibrinolysis. Even a minimal decrease in body temperature (<1 ° C) increases blood loss by almost 16%, and increases the relative risk of blood transfusion by 22% [12]. Maintaining normothermia is therefore essential.

Hypocalcemia inhibits polymerization of fibrine and decreases the activity of coagulation factors (the activity of factor VIIa in particular is dependent on calcium) and platelets. In the event of bleeding, hypocalcemia must therefore be corrected early [13].

Conclusion

We insist on the rapid recognition of the shock state during surgery for multiple hydatidosis and to distinguish its type in order to quickly institute a proper and effective treatment.

The prevention of this accident is based on surgical precautions in order to avoid leaks or intraoperative accidental ruptures of hydatid cysts, likewise any hydatid cyst surgery must be considered a surgery at risk of anaphylactic shock, or even hemorrhagic shock, especially if the cysts are close to important vascular structures.

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Authors' contributions

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