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MANAGEMENT OF INTRAOPERATIVE ANAPHYLACTIC REACTION IN HEPATIC HYDATID CYST: A CASE REPORT

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ABSTRACT

Hepatic hydatid cyst caused by *Echinococcus granulosus* is still endemic in many parts of the world and it is a common health problem, especially in developing countries. The rupture of the hydatid cyst can cause anaphylactic shock or even death during surgical treatment. We present a case report regarding anaphylactic reaction due to surgery to the liver for hydatid cyst which has an aberrant venous drainage incidentally detected during surgical operation in a 55 year old male patient. He was successfully treated with adrenaline, antihistamines, steroids and fluids. The possibility of anaphylaxis should be kept in mind; despite all the precautionary measures, without rupture of the hydatic cyst and absence of spillage of the cyst to the circulation or into the surrounding tissues, anaphylaxis can still occur. Therefore close monitoring for early diagnosis and appropriate management of anaphylaxis are essential to stabilize the patient and produce the best outcome.

INTRODUCTION

Hydatic cyst is commonly seen primarily in the liver[1]. Some procedures such as marsupialization, evacuation of the cyst elements and filling the cyst with saline after evacuation of the endocyst are currently utilized for its treatment[2,3]. The rupture of the hydatid cyst can cause anaphylactic shock or even death during surgical treatment[4]. In patients undergoing surgery for excision of hydatid cysts, any sudden findings regarding anaphylactic reaction including tachycardia, hypotension, significant bronchospasm and urticaria should alert amaesthetics to anaphylaxis[5]. Here, we present a case report regarding anaphylactic reaction due to surgery of hydatid cyst of liver which had an aberrant venous drainage incidentally detected during the surgical operation.

CASE REPORT

A 55 year old male patient presented with complaints of epigastric pain for approximately three months. Laboratory parameters including hematological and biochemical profile were normal. On physical examination, there was no abnormal finding regarding the cardiovascular and respiratory systems. Ultrasound evaluation revealed a 65 × 59 mm hydatid cyst in segment VI and VII of the liver (***Figure 1***). Surgery was decided for excision of the hydatid cyst. Informed and written consent was taken prior to surgery. The patient was premedicated with 2 mg midazolam before induction and all routine monitors were attached including electrocardiogram (ECG), noninvasive blood pressure and peripheral oxygen saturation. Intravenous dexamethasone 8 mg and ranitidine 50 mg were given for the prophylaxis before induction. Anaesthesia was induced by inj. fentanyl 100 µg, propofol 140 mg and vecuronium 5 mg. Intubation was done using a 7.5 mm cuffed oral endotracheal tube and Ventilation was maintained by intermittent positive pressure at the rate of 12 breaths/minute and tidal volume of 550 mL. Anaesthesia was maintained with sevoflurane with oxygen and nitrous oxide (50:50). Muscle relaxation was provided by using repeated doses of vecuronium.

First 30 minutes of surgery were uneventful but when the cyst excision was started, sudden and persistent desaturation (SpO_2 70%), hypotension (60/30 mmHg), hypocarbia ($EtCO_2$ 15 mmHg) and bradycardia (heart rate 35/minute) were noticed. Erythema and flushing, especially in the upper part of the patient's body were also observed. Therefore, the operation was stopped. At this time sevoflurane and nitrous oxide were discontinued and 100% oxygen was given for hypoxaemia. Simultaneously fluid resuscitation was also started for hypotension. Hypoxaemia did not improve despite 100% oxygen ventilation. Hypotension did not respond to fluid replacement. On auscultation of the lungs, there was bilateral bronchospasm. We suspected an anaphylactic reaction and a 200 µg bolus of IV adrenaline was given followed by an infusion of 5 µg/kg/minute. Intravenous hydrocortisone 100 mg and pheniramine maleate 40 mg were also given. Invasive arterial catheter was inserted and invasive blood pressure monitoring was started. Arterial blood gas analysis was done. Severe hypoxaemia was seen (PaO2 47.3 mmHg, $PaCO_2$ 54 mmHg, pH 7.2, serum bicarbonate 18 mmol, BE −8.4 and SpO_2 75%). The patient responded to fluid and adrenaline infusion within 20 minutes. The blood pressure, SpO_2 and heart rate returned slowly to normal. Following haemodynamic stabilization, the surgery was continued. The surgery team reported that there was an aberrant venous drainage detected in the hydatid cyst (***Figure 2***).

After the surgery, the patient was admitted to the intensive care unit and adrenaline infusion was continued for inotropic support for a day. The patient was discharged on fifth postoperative day.

Figure 1: B-mode ultrasound of the liver demonstrating multiple daughter cysts.

Figure 2: Contents of the hydatid cyst removed

DISCUSSION

The incidence of anaphylaxis during perioperative period is rare which range from 1:6000 to 1:20000 and the estimated mortality rate is 3-6%[6]. The common anaphylactoic agents are muscle relaxants, local anaesthetics, antibiotics, latex, chlorhexidine, hypnotics and inhalant agents, protamine, colloids, opioids and antibiotics [6].Anaphylactic reaction occurs immediately, systemically and can influence various organ systems and several symptoms have been observed such as respiratory (bronchospasm and upper airway obstruction), cardiovascular (hypotension and arrhythmias), skin (urticaria and angioedema) and gastrointestinal (nausea and vomiting)[7].

In a previous study, the incidence of intra-operative anaphylaxis with hydatid cyst was reported to be low at 0.2–3.3%[8]. During surgical cyst removal or percutaneous drainage of the liver, hydatid cyst IgE-mediated anaphylactic reaction occurs when there is spillage or release of the highly antigenic hydatid fluid into the systemic circulation[5,9]. The allergic reactions vary from mild hypersensitivity reaction to a fatal anaphylactic shock[3]. Some reports have recommended that the usage of the prophylactic corticosteroid and antihistamines could avoid anaphylactic reactions[5,10]. In the present study, anti-histamines and corticosteroids were admitted for the risk of anaphylaxis after induction. However, during the cyst excision, sudden and persistent desaturation, severe hypotension, hypocarbia and bradycardia observed. These symptoms appeared to be primarily related to anaphylaxis due to the spillage of the highly antigenic cyst fluid into the bloodstream by the hydatid cyst rupture. However, the surgical team reported that the cystic wall was intact but there was a vein in the cyst cavity.

Hydatid cyst has a high intracystic pressure and contains antigenic fluid[11]. In a previous study, the authors claimed leakage of cystic fluid into the bloodstream due to high intracystic pressure and blunt dissection[3,11]. In our case, we believe that the high intracystic pressure coupled with blunt dissection must have been the cause of leakage of cystic contents through this vein into the circulation with no apparent macroscopic rupture. So, the same etiology may also be effective in our case. In reviewing the literature, a few anaphylactic reactions have been reported with no apparent macroscopic rupture of the hydatid cysts [1,11].

When there is unexpected or sudden, rapidly progressive haemodynamic and respiratory problems, the possibility of an anaphylactic reaction should always be considered in respect to an rupture, and the diagnosis should be made immediately. Initially, the aim of treatment should be to restore both adequate cardiac output and circulatory competency[12]. Some reports have advised use of vasopressors with alpha as well as beta stimulating properties[2,5,12]. Adrenaline is the most appropriate drug of choice in the management of bronchospasm and massive peripheral vasodilation[2,12].

In addition to adrenaline, intravascular volume, vascular tone and cardiac output should be supported with colloid or crystalloid fluids[5]. In our case, we received a response within 20 minutes to epinephrine, colloid or crystalloid fluids. Besides, inhalation anaesthetics should be stopped and 100% oxygen administered for control of the airway and bronchospasm. Antihistamines are useful prophylactically and may also prevent further histamine binding after the development of anaphylactic reactions[2,13]. Corticosteroids should be given prophylactically to diminish the airway swelling and prevent recurrence of symptoms. Extubation should not be immediate.

CONCLUSION

It should be kept in mind that anaphylaxis can occur despite all the precautionary measures and absence of rupture of the hydatic cyst or spillage of the cyst to the circulation or into the surrounding tissues. The anaesthesist should be aware of anaphylactoid reaction and be prepared for treatment. Consequently, a close monitoring for early diagnosis and appropriate management of anaphylaxis are essential to stabilize the patient and produce the best outcome.

REFERENCES

1. Buyuk Y, Turan AA, Uzun I, Aybar Y, Cin O, Kurmaz G. Non-ruptured hydatid cyst can lead to death by spread of cyst content into bloodstream: an autopsy case. *Eur J Gastroenterol Hepatol.* 2005;17:671–3.
2. Jakubowski MS, Barnard DE. Anaphylactic shock during operation for hydatid disease. *Anesthesiology.* 1971;34:197–9.
3. Kol IO, Duger C, Kaygusuz K, Gursoy S, Aydin C, Mimaroglu C. Perioperative anaphylactic shock in a patient with unruptured hepatic hydatid cyst. *Anaesth Pain Intensive Care.* 2011;15:45–7.
4. Yahya AI, Przybylski J, Foud A. Anaphylactic shock in a patient with ruptured hydatid liver cyst owing to trivial abdominal trauma. *J R Coll Surg Edinb.* 1997;42:423–4.
5. Khanna P, Garg R, Pawar D. Intraoperative anaphylaxis caused by a hepatic hydatid cyst. *Singapore Med J.* 2011;52:E18–9.
6. Nel L, Eren E. Peri-operative anaphylaxis. *Br J Clin Pharmacol.* 2011;71:647–58.
7. Hepner DL, Castells MC. Anaphylaxis during the perioperative period. *Anesth Analg.* 2003;97:1381–95.
9. Sola JL, Vaquerizo A, Madariaga MJ, Opla JM, Bondia A. Intraoperative anaphylaxis caused by a hydatid cyst. *Acta Anaesthesiol Scand.* 1995;39:273–4
10. Khoury G, Jabbour-Khoury S, Soueidi A, Nabbout G, Baraka A. Anaphylactic shock complicating laparoscopic treatment of hydatid cysts of the liver. *Surg Endosc.* 1998;12:452–4
11. Kambam JR, Dymond R, Krestow M, Handte RE. Efficacy of histamine H1 and H2 receptor blockers in the anesthetic management during operation for hydatid cysts of liver and lungs. *South Med J.* 1988;81:1013–5
12. Sanei B, Hashemi SM, Mahmoudieh M. Anaphylactic shock caused by nonruptured hydatid cyst of the liver. *J Gastrointest Surg.* 2008;12:2243–5.
13. Currie M, Kerridge RK, Bacon AK, Williamson JA. Crisis management during anaesthesia: anaphylaxis and allergy. *Qual Saf Health Care.* 2005;14