Concurrent brain and lung hydatid cyst in a paediatric patient: Anaesthetic challenges

Sir,

Hydatid disease is a helminthic anthropozoonosis caused by Echinococcus granulosus. Intracranial hydatid cyst (HC) is rare, with an incidence of 1%–2%.\(^1\) We describe the anaesthetic management of intracerebral HC with a concurrent pulmonary cyst.

A 7-year-old boy (22 kg) presented with a monolocular cystic space-occupying lesion, likely HC, in the left fronto-parietal region on magnetic resonance imaging of the brain [Figure 1a]. Chest X-ray and contrast enhanced computed tomography revealed a well-defined homogeneous radio-opacity in the right middle zone; likely HC [Figure 1b and c]. A plan was made for left fronto-temporoparietal craniotomy and excision of HC as the child was symptomatic due to mass effect. The surgery for excision of the lung cyst was deferred, as the cyst was intact, and operating first on the symptomatic cyst seemed logical.

On the day of surgery, standard anaesthesia monitors were attached. Anaesthesia was induced with fentanyl and propofol. Injection vecuronium was given to facilitate tracheal intubation. The bispectral index (BIS) and neuromuscular monitoring were used to measure the depth of anaesthesia and the extent of neuromuscular blockade, respectively. Propofol infusion was started at 15 ml/h (titrated to BIS of 40–60) with oxygen: air mixture (2 l/min) in a ratio of 1:1. The patient was placed in the supine position, with the head fixed in extension using a four-pin head holder with prior skin infiltration with 2% lignocaine and additional intravenous fentanyl boluses. The patient was kept on pressure-controlled ventilation, with an inspiratory pressure of 12 cm H\(_2\)O and respiratory rate of 16–18/min, to achieve an end-tidal carbon dioxide between 32 and 36 mm Hg. These settings were adopted to provide adequate minute ventilation and to prevent hyperinflation of the lungs,
which could lead to cyst rupture. The intra-operative course was uneventful and with total excision of the intracranial cyst [Figure 2], 2 ml of 2% lignocaine was administered to prevent coughing and bucking during extubation. The post-operative period was uneventful.

Concurrent brain and lung HC is rare and imposes unique anaesthetic concerns aimed at the prevention of a significant increase in intracranial pressure (ICP) and the maintenance of intrathoracic pressure. Other goals of anaesthesia are the provision of a relaxed brain, preparedness to handle any haemodynamic instability and anaphylaxis from the rupture of HC.

We were cautious to prevent the rupture of HC at any of the locations. Throughout the perioperative period, a rise in ICP was prevented during intubation, head positioning, pin application, skin incision, pin removal or extubation. Propofol was used because of its short duration of action and rapid titrability. It causes dose-dependent cerebral vasoconstriction and a fall in cerebral blood flow and cerebral metabolic rate of oxygen consumption.[2]

Intrathoracic cyst warrants gentle intubation and ventilation techniques to prevent its rupture with positive pressure ventilation. Hyperinflation of lung and possible lung cyst rupture was avoided by delivering a tidal volume of around 5–7 ml/kg while ensuring normocapnia. Coughing and bucking were avoided by ensuring an adequate level of anaesthesia during intubation and use of intravenous lignocaine before intubation and extubation.

Intra-operative cyst rupture may cause severe anaphylaxis. This manifests as bronchospasm and cardiovascular collapse.[3] Atraumatic delivery of the cyst by the surgeon facilitated by hydro-dissection and gravity-assisted delivery of cyst prevents rupture. Inadvertent cyst rupture requires washing the cavity with hypertonic saline.[4] The anaesthesiologist's role lies in comprehensive preparation, prompt detection and early aggressive therapy with crystalloids and intravenous epinephrine with the administration of 100% oxygen. We were prepared with all the emergency drugs to manage any such crisis. Hydrocortisone is used for prophylaxis as well as the treatment of refractory hypotension. Normovolaemia, normothermia, normocapnia and normotension have to be ensured.

Successful anaesthetic management of concurrent intrathoracic and intracranial HC in paediatric population requires thorough pre-procedure preparation, close vital monitoring, provision of the relaxed brain, management of anaphylactic shock and close coordination with surgeons. An increase in ICP and intrathoracic pressure has to be avoided at all times.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient’s parent(s) has/have given his/her/their consent
for his/her/their images and other clinical information to be reported in the journal. The patient’s parents understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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