Original Article

Lung Hydatid and Broncho-Cavitary Communications: Challenges in the Management and Outcome

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Abstract

Background: The aim was to analyse the challenges and outcomes in operated patients of hydatid lung with broncho-cavitary communications. **Materials and Methods:** The retrospective data between June 2017 and May 2022 were obtained. The number of broncho-cavitary communications was recorded and they were suture repaired using polypropylene. The duration required for repair and the average fall in the SpO_2 were recorded. Those with incomplete data or follow-up were excluded. The outcome parameters considered were number of broncho-cavitary communications, duration of stay, duration of intercostal tube, duration of air leak and requirement of ventilator support. **Results:** A total of 33 patients out of 36 formed the study group. The mean age was 6 years (range 2–18 years). There were 23 right-sided, eight left-sided and two bilateral cysts. Broncho-cavitary communications were seen in 33 patients. The average number of communications was 3 (range: 2–8). The average duration required to suture close the communications was 30 s (range 20–180 s). The average fall in the SpO_2 was 40% (range 20%–74%). The main challenge was rapid identification of communications and prompt repair. The mean duration of surgery was 2.15 h (range 1.45–3.15 h). Ventilator support in the post-operative period was required in four patients. The average duration of intercostal tube drainage required was 7 days (range: 6–14 days). The average duration of hospital stay was 14 days (range 12–34 days). All the communications were repaired using Prolene 3-0 sutures. None of the patients was operated with a double-lumen endobronchial tube. **Conclusion:** Broncho-cavitary communication in hydatid cyst is associated with an operative challenge due to sudden air leak. These patients require judicious management.

Keywords: Air leak, broncho-cavitary communications, bronchopleural fistula, double-lumen endobronchial tube, hydatid cyst

Introduction

Hydatid cyst is a common disease in the poor socioeconomic group. The management of hydatid cyst in liver is standardised. The incidence of the lung hydatid cyst is comparatively less, and management of these cases is associated with challenges due to the presence of associated broncho-cavitary communications.

Aims

The aim was to analyse the challenges and outcomes in operated patients of hydatid lung with broncho-cavitary communications.

Materials and Methods

The retrospective data of the patients between 0 and 18 years of age operated for lung hydatid cyst between June 2017 and May 2022 in a tertiary care hospital were obtained. Well-informed consent for participation in the study was obtained from the parents of the study participants, because all of the participants in the study were minors. Those where data were incomplete, did not give consent or who did not come in the follow-up were excluded. The diagnosis was made on the basis of the clinical findings with computed tomography scan thorax findings [Figure 1]. The presence of broncho-cavitary communications was confirmed on exploration after the removal of hydatid cyst lung. All the patients underwent open thoracotomy (due to lack of availability of single-lung ventilation/lung isolation) and excision of cyst with closure

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of the broncho-cavitary communications using 3-0 Prolene sutures [Figure 2]. The cavity was not obliterated in any of the patients. All the patients were managed by high-frequency gentle breaths till the communications were repaired. The number of broncho-cavitary communications, duration required for closure of major communications and the fall in the saturation after the excision of the cyst till the closure of the broncho-cavitary communications was recorded. The outcome parameters considered for the analysis were number of broncho-cavitary communications, duration required for the repair of broncho-cavitary communication, fall in the SpO_2, duration of surgery, duration of major air leak in the intercostal drain (ICD), duration of intercostal tube, duration of hospital stay and requirement of ventilator support. Ethical clearance for the study was obtained from the institute's Ethics Committee. The Helsinki declaration for handling of the human subjects was followed. The data obtained were compiled and analysed.

Results

A total of 36 patients were operated for lung hydatid cyst during the study. Thirty-three patients had broncho-cavitary communications and they formed the study group. There were 15 females and 18 males. The mean age at presentation and surgery was 6 years (range 2–18 years). There were 23 right-sided, eight left-sided and two bilateral cyst. The average number of communications was 3 (range: 2–8). The average duration required to suture close the communications was 30 s (range 20–180 s). The main challenge in these cases was a rapid fall in the SpO2 after the removal of the hydatid cyst and the requirement of prompt suture closure of the communications to manage the sudden fall in saturation. The average fall in the SpO_2 was 40% (range 20%–74%). The mean duration of surgery was 2.15 h (range 1.45–3.15 h). Ventilator support in the post-operative period was required in four patients. The average duration of intercostal tube drainage required was 7 days (range: 6–14 days). Brisk column

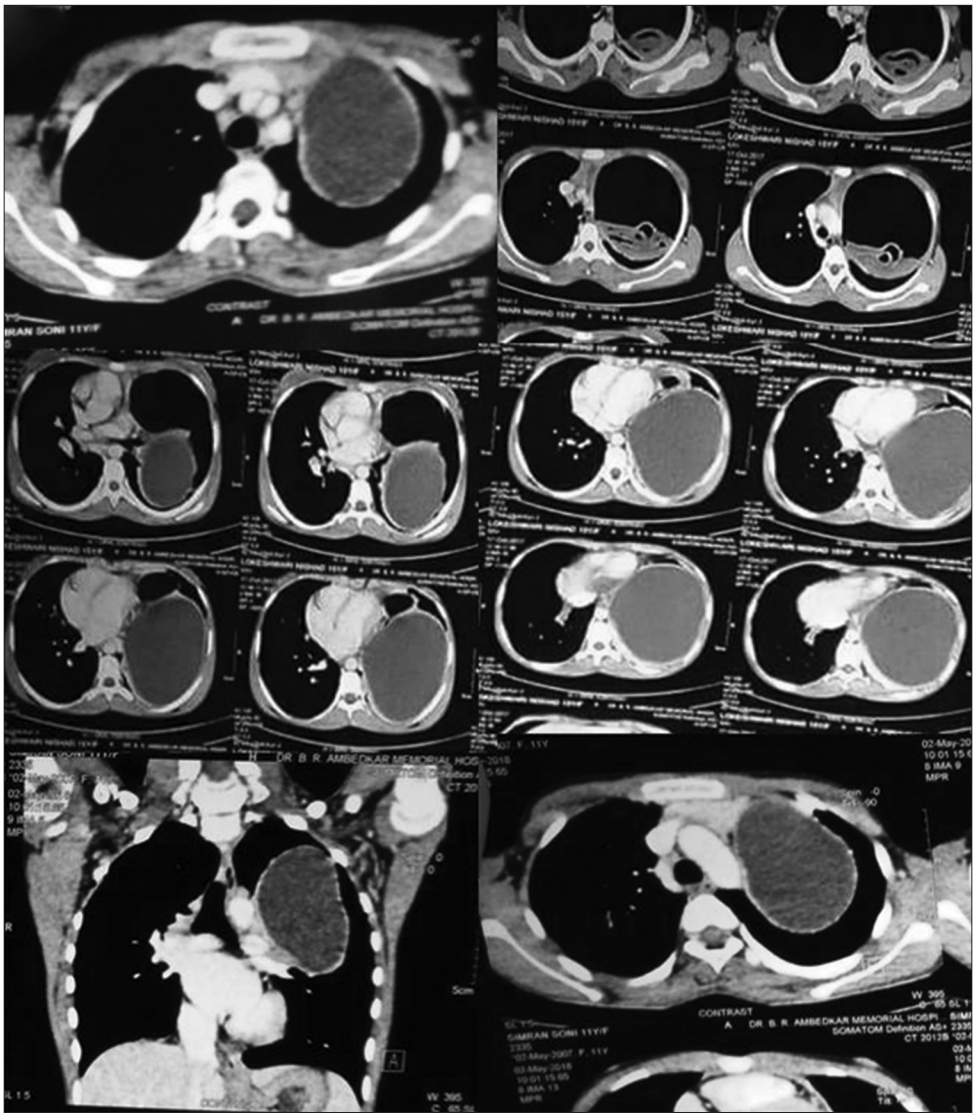


Figure 1: CT thorax indicating various types of hydatid lung. CT: Computed tomography

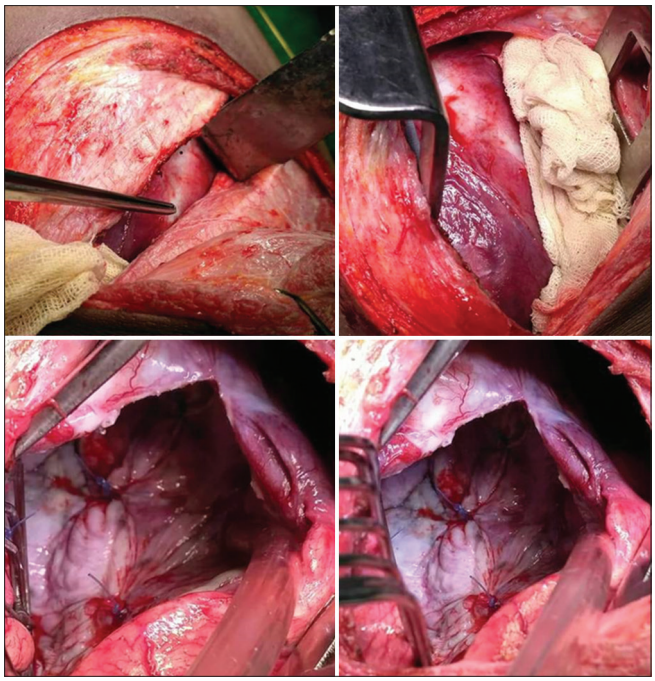


Figure 2: Operative images

movement and persistent air leak in the ICD were seen in four patients, which were managed by long-term ICD drainage, and the application of continuous low negative suction in the ICD to allow the lung to expand. The average duration of hospital stay was 14 days (range 12–34 days). All the bronchopleural fistulas were repaired using Prolene 3-0 sutures. The average duration required to suture close the communications was 30 s (range 20–180 s). None of the patient was operated with a double-lumen endobronchial tube.

Discussion

Hydatid cyst is a disease caused by the infection with parasite echinococcus. Liver is the most commonly affected organ with this disease, but hydatid cyst has been described in almost every organ of the body. The clinical presentation of the patients of hydatid cyst is varied, and it mainly depends on the organ of involvement.[1,2] The clinical presentation can be in the form of an incidentally detected lesion on an ultrasound done for some other indications or it may be stormy requiring an intensive care in a complicated situation-like ruptured hydatid of the lung or hydatid of the brain. The lung is the second-most common organ involved in hydatid cyst. The hydatid cyst of the lung is slightly different from the standard hydatid cyst of liver in the way that there is no pericyst formation. This is due to the lack of the resistance offered by the organ. This may thus lead to cyst of massive sizes. The hydatid cyst of the lung may present as an incidentally detected mass or opacity in the X-ray chest done for other indications, or it may present with an excessive cough and associated passage of grapes-like daughter cyst in the sputum.[3]

There have been various indications for the intervention of hydatid cyst of the lung, but the most common indication is complicated ruptured hydatid cyst of the lung. The definitive cure for pulmonary hydatidosis is undoubtedly surgical.[4-6] Several surgical procedures were described for the treatment of pulmonary hydatid cysts using the Barrett technique in 1952 (intact endocystectomy without preliminary aspiration), pericystectomy (i.e., Perez-Fontana operation) and lobectomy as described by different authors.[7-10] The surgical management of these patients is technically challenging due to the invariable presence of the broncho-cavitary communications with the bed. These communications make the intraoperative stabilisation of these patients a challenge for the attending anaesthetist due to massive air leak and fall in the saturation as soon as the cyst is excised. It is a challenge also for the operating surgeon to accurately identify the sites of communications with air leak and suture repair them promptly. Lack of complete identification or improper repair may lead to persistent air leak in the post-operative period adding to the morbidity of the patient. Persistent large-volume air leak and deterioration of the patient may even require re-exploration for an attempted re-repair of the communication and if not possible may end up with lobectomy. Double-lumen endotracheal tubes are recommended in the management of these cases to achieve lung exclusion. The advantages of double-lumen tubes are as follows:

1. They help in the selective ventilation of the normal lung intraoperatively for a better control on the airways
2. The affected side is collapsed, and thus, these patients can be dealt with thoracoscopically also
3. As the side involved is excluded, the possibility of flooding of the normal side on the lateral thoracotomy position is minimised
4. While the time the surgeon repairs the broncho-cavitary communications, the anaesthetist could comfortably ventilate the patient, and thus, the situation is in a better control rather than a panic situation due to the loss of air through the communications while repair.

Unfortunately, double-lumen endotracheal tubes are currently not available below 26; thus, it is difficult to manage the children below 8 years of age using them. Other techniques of exclusion commonly used in the paediatric population are the use of Fogarty catheter, Univent endotracheal tubes etc., but they also require a flexible bronchoscopic guidance. Unfortunately, we are working in a setup where there are neither double-lumen tubes nor flexible bronchoscopes, but a significant load of such cases; the only option left thus is a rapid control of these leaks and closure as soon as possible. We feel that the larger communications if repaired on time, stabilises the patients and they can be comfortably managed even in the absence of these accessories. As lung exclusion is not there and a rapid repair is anticipated, we offered open repair in all the patients. The main challenge with us was a rapid identification of the site of communication and suture repair of the leak promptly. There were few cases where we had persistent air leak in the post-operative period, but fortunately, none of them required re-exploration. A proper identification

of the lung anatomy while exploration however is always required as there is a need of promptness and proceeds to lobectomy if required.

Conclusion

Hydatid cyst lung is generally associated with broncho-cavitary communication. We have to be prepared for repairing them at the time of excision. The repair should be fast and specific identifying the major leaks first. These cases need to be managed judiciously for a better outcome.

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Conflicts of interest

There are no conflicts of interest.

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