

The authors did not make it clear why patients who received a Heimlich valve and presented air leakage remained hospitalized, since the implantation of this device atypically leads to early discharge and greater mobility of patients. Why did the patients remain hospitalized? Was it only due to the pleural disease—or was it in order to administer the antibiotic therapy? What were the characteristics of those patients, since using Heimlich valves is still not universally accepted in children? The authors did not mention anything regarding the clinical treatment, such as its duration or changes in the treatment regimen based on the surgical findings.

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Authors' reply

Resposta dos autores

To the editor:

We conducted a retrospective study involving pediatric patients with pleural empyema who were submitted to thoracoscopy. This study underscored the importance of the early participation of a thoracic surgeon in the therapeutic interventions to treat pleural empyema in children. Our focus was on presenting the results of surgical management using thoracoscopy.

We sustain that, in all cases, the indication of thoracoscopy was based on “. . . pleural effusion with no clinical and radiological response to clinical

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treatment (antibiotics . . . or thoracocentesis) . . . and loculated pleural effusion (documented using ultrasound or computer-based tomography).”⁽¹⁾ As reported in the study, only one patient was, to our surprise (since there were signs of empyema in the tomographic findings, as we will later emphasize), anatomopathologically diagnosed with tuberculosis-related pleural effusion. In addition, only one patient presented comorbidities that predisposed to worse evolution, not only of the pleural effusion but also in other organs and systems. Consequently,

the patient died due to late postoperative complications. All of the other 115 patients were children with parapneumonic effusion and no comorbidities.

Ultrasound and chest X-rays, although “examiner-dependent”, presented no “high specificity criteria for the characterization of pleural empyema”. Therefore, the volume of pleural effusion quantified through the use of these methods was not used as a parameter for the therapeutic and diagnostic decision. The ultrasound findings of loculations, septa and debris indicated that those patients would not benefit from more conservative procedures (such as thoracentesis or pleural drainage). However, chest tomography scans can reveal characteristics with high (96%-100%) specificity for empyema, such as pleural thickening and highlighting of the pleura after the injection of intravenous contrast, as well as the thickening and blurring of extrapleural fat images. In addition, chest tomography reveals, in detail, the involvement of lung parenchyma and the volume of the pleural effusion, as well as other characteristics of the pleural effusion and the pleura.⁽²⁾ Therefore, 64% of the thoroscopies we performed were indicated on the basis of the chest tomography findings.

The majority of our patients were very young, with a mean age of four years and a median of three. Therefore, we quote, “In pediatric patients, we find some peculiarities inherent to this age bracket regarding the endoscopic instrument used and the ventilation technique in the intra-operative period, principally in patients under the age of 12.”

Regarding the preoperative procedure, due to following aspects, 68 patients (58%) were submitted to thoracoscopy without prior thoracentesis or pleural drainage:

- The evolution of the disease was generally long prior to our intervention (higher chances of organization, making puncture or drainage ineffective).
- Radiological evidence of loculation and septation indicated the need for thoracoscopy.
- Since sedation and immobilization were necessary for most patients due to their age, by means of restraints or general anesthesia for any invasive intervention, we preferred to perform a single safe intervention that would be both diagnostic and therapeutic.
- We had easy access to operating rooms and intensive care units.

Only 13 patients were submitted to thoracentesis prior to thoracoscopy. In 36 patients, pleural drainage with thin pigtail catheters was not effective, and thoracoscopy was necessary.

The case that called the most attention, due to the short hospitalization period, was that of an eight-year-old patient whose ultrasound, performed in the emergency room, revealed pleural effusion with debris. The patient underwent video-assisted thoracoscopy with debridement of septa and fibrin. In addition, 600 mL of purulent fluid was drained. The anterior drainage tube was removed on the second postoperative day, and the posterior tube was removed on the third postoperative day. The patient was discharged on the fourth postoperative day (no fever for 48 h) and completed antibiotic therapy at home.

There is no consensus regarding the minimal output rate for tube removal in children. One author suggested an output rate lower than 2 mL/kg/day.⁽¹⁾ Another author suggested an output rate lower than 10-15 mL.⁽³⁾ Some authors have suggested a ban on drainage, whereas others recommend that it be used only minimally.^(4,5) According to the British Thoracic Society consensus, we quote, “There is no evidence base to guide this decision and no substitute for clinical experience.” All chest tubes were removed after clinical and radiological improvement and minimal drainage (none greater than 50 mL/day).

Finally, we used Heimlich valves in order to decrease resistance of the drainage system (compared to water seal and tubes) to prolonged air leakage, thereby facilitating lung expansion. Therefore, the Heimlich valves were not used in order to promote early discharge, since these patients needed antibiotic therapy for a longer period of time. Greater mobility, early discharge and tube removal within a week after discharge are situations that occurred with the aid of the Heimlich valve.⁽⁶⁾ In addition, we always chose to use a Heimlich valve rather than open tube thoracostomy in order to avoid any new pleural or respiratory complications. Open thoracostomy with or without the use of a chest tube is indicated for patients with blocked pleural cavity, fixed lungs or chronic empyema. Otherwise, a valve is necessary.

In the beginning of our long experience, when we identified necrotizing pneumonia during surgery, we opted for conservative pulmonary resection. However, we found that debridement of necrotic

areas, drainage of lung abscesses into the pleural cavity and effective drainage of the pleural cavity (often with the use of anterior and posterior chest tubes) were sufficient for the resolution, cicatrization and remodeling of the affected areas in the lungs of children. Chest X-rays and tomography scans revealed near-normal results after 1-2 months of outpatient follow-up treatment.

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