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VATS: first step in the parapneumonic empyema*

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SUMMARY: **VATS: first step in the parapneumonic empyema.**

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Pneumonia is a common cause of pediatric hospitalization and almost 50% of children hospitalized for pneumonia develops meta pneumonic pleural effusion, most of which resolve spontaneously (1). The meta pneumonic effusion remains a major source of morbidity and mortality in the pediatric population and is a complication on the rise in both the U.S. (2) and Europe (3-6).

There is no uniformity of treatment of the meta pneumonic effusion in its early stages and are still questioning some aspects of proper management, remains uncertain and not always shared the operative timing (7). The treatment options are represented, in combination with antibiotic therapy, the thoracentesis (8), the positioning of one or more pleural drainage (9), fibrinolytic therapy (10), the toilet of the pleural cavity by means of video-assisted thoracoscopic surgery (VATS) (11) or "open" with thoracotomy (12) or traditional mini thoracotomy. We report our experience concerning the processing of meta pneumonic effusion, suggesting how the video thoracoscopy may be the treatment of choice in the early stages of the disease.

KEY WORDS: VATS - Meta pneumonic effusion - Empyema.

Introduction

According to the definition of the American Thoracic Society, the pathological manifestations of the meta pneumonic effusion are divided into three phases (13):

- Exudative phase, which lasts more than 3-4 days and is rapidly evolving into a collection of low viscosity fluids and cellular content (pleural fluid clear, sterile; leukocytes < 10.000/ l; LDH < 1.000U/l; glucose > 40mg/dl; pH > 7.2);

- Phase fibrin-purulent (empyema), which marks the appearance of pus and fibrin and during which the harvest of fluids and starts compressing the lung, characterized by bacterial invasion of the pleural space, progressive inflammation, activation of coagulation factors and suppression of fibrinolysis, invasion of polymorphonuclear cells, fibrin deposition with or without "loculation" (glucose < 40mg/dl; pH: 7-7.2; LDH > 1000 U/l; protein > 2.5g/dl).

- The stage of organization, characterized the activity of fibroblasts both pleural surfaces that induces the formation of fibrous membranes inelastic (rigid rind), with pleural thickening, loculation of pleural cavity; fibrous tissue traps the lung parenchyma reducing the movements of the chest.

The stage of effusion influence the response to therapy, which must ensure the restoration of lung function, thus obviating the onset of a restrictive lung disease and ensuring rapid healing with good functional recovery. Treatment options may be medical or surgical (14). The type of antibiotic used depends on the age, medical condition of the patient and by the agent suspected to be responsible. The type of antibiotics should be targeted and then corrected according to the crop carried out. When medical treatment fails is mandatory the surgery approach (thoracentesis, placement of drainage tube, fibrinolytic therapy). In the past, thoracotomy and debridement were used in the later stages of empyema. With the increased use of endoscopic techniques, thoracoscopy seems to be an excellent alternative to surgery "open" especially if performed in the early stages of the disease (15). This allows, for debridement with minimal morbidity and quicker recovery (16).

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Patients and methods

Over the past four years, 8 children with a diagnosis of meta pneumonic pleural effusion were admitted to our unit (M:F = 3:1; aged 2.4 to 6.10 years). Of these, three have come to our observation with a meta pneumonic effusion stage I (two with localization to the left and 1 right) (Figure 1), 4 with meta pneumonic effusion stage II (3 left and 1 right) and 1 with bilateral empyema. Three children with effusion in exudative phase were subjected to thoracentesis with the positioning of the drainage tube: two of them stayed in hospital for about 12 days but in the third case the effusion has evolved toward the phase-fibrin and purulent and therefore it has been necessary to subject the patient to a surgical debridement by thoracotomy (with an hospitalization of 18 days). Two children diagnosed with the input of effusion during fibrin-purulent were subjected to thoracentesis and placement of drainage tube: one was discharged after 14 days whilst the second one (with bilateral location) was subsequently subjected to thoracotomy. With a small deposit which is being organized underwent surgery segmentectomy by thoracotomy with debridement. The two cases referred in the first instance to thoracoscopy (meta pneumonic effusion to the second stage) were hospitalized for 6 days (Figures 2, 3).

Discussion

Traditionally a patient's joint with fever, cough and dyspnoea is subjected to chest radiography, and then, in the presence of meta pneumonic effusion, for ultrasonography or CT scan to detect the possible presence of loculations (17) (Figure 4). The antibiotics **doses** with or without more invasive maneuvers (thoracentesis or placement of drainage tube) remains the algorithm treatment of choice for many centers and only when the payment progresses to a stage fibrin-purulent or organization, we proceed to thoracotomy surgery or thoracoscopy. In our brief experience we have found benefits with the primary VATS, the results are in fact giving lower time of hospitalization, stay drains, X-ray exposure, antibiotic treatment. The two patients who underwent VATS were subject to less number of procedures therefore with benefits also in economic terms (18).

Conclusions

On the basis of the data we collected in our experience the primary thoracoscopic approach is associated with a shorter hospitalization, with a reduction in surgical procedures, reduction of antibiotic and analgesic.

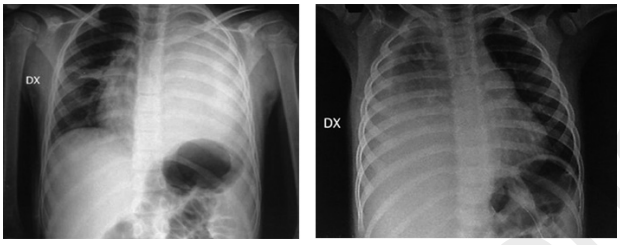

Fig. 1 - Two cases of metapneumonic effusion.

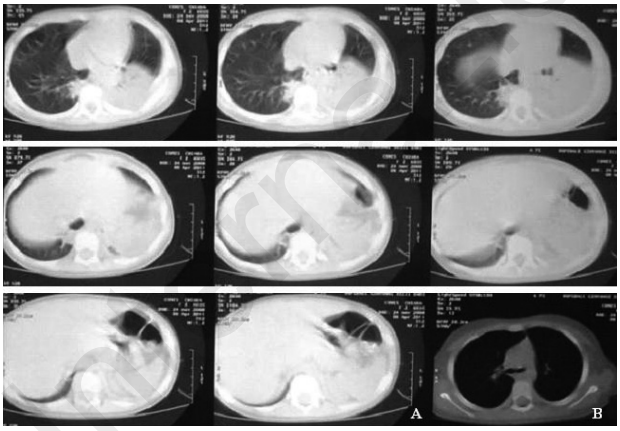

Fig. 2 - CT before (A) and after (B) VATS in a left meta pneumonic effusion at the second stage.

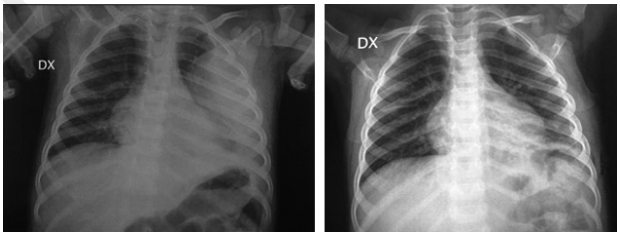

Fig. 3 - Rx before and after VATS in a left meta pneumonic effusion at the second stage.

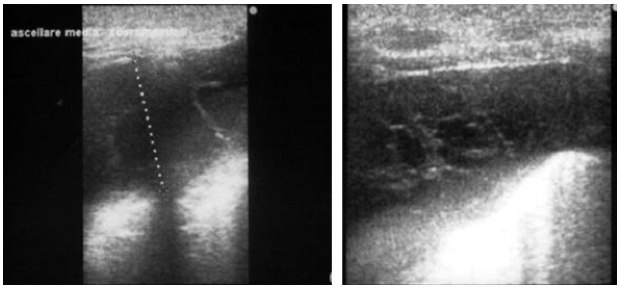

Fig. 4 - U.S. demonstrating effusion and loculations of costo-diaphragmatic sinus.

The benefits of an early and primary use of video-assisted thoracoscopic surgery includes the ability to identify the stage and effusion type (inspecting a more accurate costphrenic spaces and the apex of the lung and performing bacterial culture and physical-chemical liquid with

white blood cell count), a quick etiological diagnosis, a direct and more accurately drainage pipe thus to provide decortications (19, 20). VATS, therefore, has a minimal morbidity and allows to achieve all the purposes of the surgical treatment. Our experience confirms, therefore, that the minimally invasive thoracoscopic treatment in the early stages is simple, safe and decisive for thoracic pathology of meta pneumonic effusions.

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