THE MANAGEMENT OF COMMUNITY-ACQUIRED PNEUMONIA COMPLICATED BY PARAPNEUMONIC EFFUSION IN CHILDREN: A SINGLE-CENTRE EXPERIENCE

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Masterproef voorgedragen in de master in de specialistische geneeskunde: afstudeerrichting pediatrie
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“De auteur(s) en de promotor geven de toelating deze masterproef voor consultatie beschikbaar te stellen en delen ervan te kopiëren voor persoonlijk gebruik. Elk ander gebruik valt onder de beperkingen van het auteursrecht, in het bijzonder met betrekking tot de verplichting uitdrukkelijk de bron te vermelden bij het aanhalen van resultaten uit deze masterproef.”

Stefanie Bracke

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ABSTRACT

BACKGROUND
Community-acquired pneumonia (CAP) is a commonly diagnosed disease in childhood. Parapneumonic effusion is its well-known complication. Infections with *S. pneumoniae* are the most common cause of this complication. The management of parapneumonic effusion as a complication of CAP consists of intravenous antibiotic therapy and thoracic drainage, with or without intrapleural fibrinolytics, and/or surgical intervention. A recent debate covers the optimal timing of an operative approach. The main objective of this study is to describe the management and outcome of pediatric parapneumonic effusion as a complication of CAP in our institution over a period of 5 years. A second goal is to describe the microbiological profile of the isolated pathogens.

METHODS
We retrospectively reviewed the demographic, clinical, biochemical, microbiological and management data of all pediatric patients (0 to 16 years old) admitted with parapneumonic effusion as a complication of CAP to the Ghent University Hospital from January 1st, 2009 till December 31st, 2013.

RESULTS
In total, 158 patients met the inclusion criteria. Of the 158 patients, 155 (98.1%) underwent thoracic drainage, out of which 117 (75.5%) were also treated with intrapleural fibrinolytics. In only 3 (1.9%) children surgery was the primary approach. In most patients (n=135, 87.1%) the management with chest tube drainage with or without fibrinolytics was successful, without need for secondary surgery. *S. pneumoniae* was isolated in 32 (20.3%) patients.

CONCLUSION
In our institution therapy with intravenous antibiotics and chest tube drainage with or without fibrinolytics remains the first treatment for the management of parapneumonic effusion as a complication of CAP. This strategy proved to be successful in most patients. *S. pneumoniae* was the micro-organism most often isolated.
INTRODUCTION

Community-Acquired Pneumonia (CAP) is a commonly diagnosed disease in childhood, with a yearly incidence of 3 to 4/100 children under 5 years of age (1). CAP is defined as the occurrence of symptoms of pneumonia (fever, cough and/or other respiratory symptoms such as tachypnea and respiratory distress) in a person infected outside the hospital environment (2). If documented, the etiology of CAP in children under 2 years of age is most often viral. However, in older or seriously ill patients requiring hospitalization, the infection is most often caused by bacteria (3).

The incidence of CAP decreased after the implementation of the 7-valent pneumococcal conjugate vaccine (PCV-7). Later, the 13-valent pneumococcal conjugate vaccine (PCV-13) further reduced the CAP hospitalization rate (4). Introduction of PCV-7 and PCV-13 has resulted in a 13% and 47% incidence reduction of CAP respectively (5).

Parapneumonic effusion is a well-known complication of CAP, and indicates the presence of fluid in the pleural space. This complication occurs in 2 to 12% of the patients with CAP. Infections with *S. pneumoniae* are the most common cause of this complication (20%). However, small effusions occur in up to 10% of viral CAP (6). The introduction of the PCV-13 vaccine didn’t only cause a reduction in the incidence of pediatric CAP, but was also associated with a 52.7% decrease in CAP with parapneumonic effusion (7). A parapneumonic effusion is suspected in case of persistent fever despite adequate antibiotic therapy, and/or damping and diminished breath sounds at percussion and auscultation. The diagnosis can be confirmed via imaging techniques (ultrasound, chest X-ray, computed tomography).

We can distinguish three pathophysiologic stages in the dynamic process of parapneumonic effusion development (8,9).

- The exudative phase evolves when pulmonary interstitial fluid crosses the inflamed visceral pleura and accumulates in the pleural space, together with an exudate derived from local microvessels. The fluid is clear and sterile at this stage.
- In the fibrinopurulent phase the pleural fluid becomes invaded with bacteria from the lung parenchyma. The fluid becomes pus, and we can now speak of empyema. Also, fibrin
deposition on the visceral and parietal pleural surface provokes formation of loculations and as such creates isolated collections of pus.

- The organizational phase starts with the invasion of fibroblasts, which turn the multiple interpleural fibrin membranes into a thick inelastic peel, thereby encasing the parenchyma and limiting the lung expansion. This is known as entrapment of the lung.

The treatment of parapneumonic effusion in pediatric CAP coincides with its above mentioned natural course. A small pleural effusion can be managed by intravenous antibiotics alone. However, larger effusions (> 15-20 mm on lateral decubitus X-ray or > ¼ of the hemithorax) require drainage. This results in a more rapidly resolution of the inflammation, and a reduction in length of hospital stay (LOS). Drainage can be achieved via percutaneous insertion of a chest tube, whether or not followed by intrapleural fibrinolytics, or via ‘video-assisted thoracoscopic surgery’ (VATS). Intrapleural fibrinolytics are used for the degradation of fibrinous membranes, thereby enhancing the draining of pleural fluid via the chest tube. Nevertheless, once entrapment of the lung occurs a surgical intervention is often needed (9, 10). A recent debate covers the optimal timing of surgery: primary in case of a loculated effusion or empyema, or secondary in case of failure of the therapy with intravenous antibiotics, chest tube drainage and intrapleural fibrinolytics.

Our local treatment protocol is based on the guidelines of the British Thoracic Society (BTS) (9), and states that small pleural effusions (< 15-20 mm) must be managed by intravenous antibiotics alone. Our first-choice empiric antibiotic is intravenous amoxicillin, in a daily dose of 150 to 200 mg/kg in 4 gifts. For larger effusions (> 15-20 mm), a small bore chest drain (8-12G) is inserted under ultrasonic guidance. If an inadequate drainage of the pleural fluid occurs in the 24 hours following chest tube insertion or loculations are seen on ultrasound, urokinase 3000 units/kg is administrated, and if necessary repeated in the following days. Practically, after instillation of the fibrinolytics via the chest tube, the drain is clamped for 4 hours during which mobilization of the patients and physiotherapy is performed. After this, suction is applied. Both instillation and drainage can be painful, and adequate pain management is therefore a key part of the treatment of these patients. Surgery is performed in case of lung entrapment, and is also considered in case of failure of the conventional therapy. By this, we mean the presence of sepsis with persistent pleural fluid after 3 to 4 days of adequate therapy with intravenous antibiotics, thoracic drainage and fibrinolytics. The choice of surgical intervention, i.e. thoracoscopy (including VATS) or thoracotomy, is made by the surgical team. Early multidisciplinary evaluation is planned, to avoid
delayed referral for secondary surgery. The chest tube is removed if a favorable clinical evolution (improvement of the general condition, disappearance of fever and decrease of the inflammatory markers) and a vigorous decline in the evacuation of pleural fluid is seen. There is no need for a complete cessation of the pleural fluid production, as the presence of a chest tube as such can maintain an exudative reaction. After removing the thoracic drain, a chest X-ray is performed to rule out pneumothorax. A switch to oral amoxicillin is made if a resolution of clinical symptoms and a decrease of inflammatory markers (CRP < 20 mg/L) is seen. Oral amoxicillin is then continued according to clinical and biochemical evolution.

The main objective of this study was to describe the management and outcome of pediatric parapneumonic effusion as a complication of CAP in our tertiary institution over a 5 year period. Hence, we could evaluate our above mentioned conservative approach. A second goal was to describe the microbiological profile of the isolated pathogens, in order to evaluate our empirical antibiotic management.
METHODS

This study was approved by the institutional review board of the Ghent University Hospital, Ghent, Belgium (registration number B670201523289).

1. STUDY DESIGN

We retrospectively reviewed all the charts from pediatric patients (0 to 16 years old) admitted with a clinically significant parapneumonic effusion as a complication of CAP to the Ghent University Hospital from January 1st, 2009 till December 31st, 2013. The demographic, clinical, biochemical, microbiological, radiological and management data extracted from the electronic patient files were gathered in a database.

Prior to the data collection, a thorough literature search was conducted using the electronic database PubMed. The following search terms were used: ‘pediatric parapneumonic effusion management’, ‘pediatric empyema management’, ‘empyema predictive factors management’, ‘parapneumonic effusion PCV13 vaccine’ and ‘community-acquired pneumonia PCV13 vaccine’. All the electronically available articles written in English and published after 2005 were included in our literature review (n=58).

2. PATIENTS

Patients included in this study were diagnosed with parapneumonic effusion as a complication of CAP based on clinical features (fever > 38.5 °C, dyspnea, cough, and/or chest pain) and radiological findings (pneumonia and pleural effusion on chest X-ray). According to the local protocol, patients were admitted to the Pediatric Intensive Care Unit (PICU) if an indication for drainage of the pleural fluid existed.

3. DEFINITIONS

Possible primary interventions are intravenous antibiotics with thoracic drainage alone, intravenous antibiotics with thoracic drainage and intrapleural fibrinolytics or intravenous antibiotics and primary surgery (thoracoscopy (including VATS) or thoracotomy).
Conventional or conservative therapy are the above mentioned treatment strategies, with the exception of the last one. The need for secondary surgery is considered as failure of the primary intervention.

4. ANALYSIS AND DESCRIPTION OF THE DATA

We used our database to map the management strategy for each patient. Also, we made a description of the age and sex distribution, the type of symptoms at the first day of hospitalization, the vaccination coverage, the distribution of causative micro-organisms, the LOS at the PICU and the total LOS.
RESULTS

1. CLINICAL AND DEMOGRAPHIC CHARACTERISTICS

One-hundred fifty eight patients were included, of which 86 males. The age at admission ranged from 4 months to 15 years 9 months, with a mean age at admission of 4 years 4 months.

The most common symptom at presentation was fever (n=140; 88.6%), followed by dyspnea (n=103; 65.2%), cough (n=77; 48.7%), vomiting (n=31; 19.6%) and thoracic pain (n=30; 19.0%). The mean duration between the first symptoms and the first admission was 5.2 days.

2. MANAGEMENT STRATEGY

As primary intervention, 155 (98.1%) patients received intravenous antibiotics and a percutaneous chest drain. Of these, 38 (24.5%) were treated with chest tube only, and 117 (75.5%) were concomitantly treated with intrapleural fibrinolytics. In only 3 (1.9%) children surgery was the primary approach based on clinical and radiological findings, thoracotomy being the chosen technique in all of them. In those 3 patients, lung entrapment was confirmed during the surgical intervention (figure 1).

3. MANAGEMENT OUTCOME

In 135 of 155 (87.1%) patients, the conservative management strategy with intravenous antibiotics and chest tube drainage with or without fibrinolytics was successful, and there was no need for secondary surgery. However, in the remaining 20 (12.7%) patients, secondary surgery was performed because of treatment failure. Of these, 3 (15.0%) received antibiotics and chest tube drainage only prior to the secondary intervention, and 17 (85.0%) received antibiotics and chest tube drainage with intrapleural fibrinolytics. As surgical technique, thoracoscopy (including VATS) was performed in 11 (55.0%) patients, thoracotomy in the other 9 (45.0%). The mean age of the patients with a thoracoscopy and thoracotomy was 4 years 8 months and 2 years 6 months respectively. None of the 3 patients with primary surgery needed a secondary intervention. The mean duration between primary and secondary intervention was 7.4 days (figure 1).
Of the 20 patients with secondary surgery, 3 (15.0%) needed an additional surgical intervention thereafter. Thoracotomy was the chosen technique in all of them. In 2 patients the reason for re-intervention was the presence of a bronchopleural fistula, in the other patient it was the recurrence of empyema (figure 1).

No mortality was seen. In total, 4 patients presented with respiratory and hemodynamic failure because of septic shock. They were intubated, and received fluid resuscitation together with vasopressive and inotropic medication. One patient was known with trisomy 21 and had a corrected tetralogy of Fallot in the medical history. The other 3 patients had no significant previous history. In two of them, *S. pyogenes* was isolated from the blood and pleural fluid culture.

### 4. LENGTH OF HOSPITAL STAY AT THE PICU

For the patients successfully treated with conservative therapy, the mean LOS after primary intervention at the PICU was 5.4 and 7.0 days for the patients treated with intravenous antibiotics and thoracic drainage alone (n=35), and intravenous antibiotics with thoracic drainage and intrapleural fibrinolytics (n=100) respectively. For the 3 patients having surgery as primary intervention, the mean LOS at the PICU after the intervention reached 6.0 days. In the 20 patients needing secondary surgery following primary chest tube drainage, the mean LOS at the PICU after primary intervention was 14.0 days (table 1).

### 5. TOTAL LENGTH OF HOSPITAL STAY

For the patients successfully treated with conservative therapy, the mean total LOS after primary intervention was 10.9 and 12.1 days for the patients treated with intravenous antibiotics and thoracic drainage alone (n=35), and intravenous antibiotics with thoracic drainage and intrapleural fibrinolytics (n=100) respectively. However, in every group almost half of the data were missing, with 16 (45.7%) and 45 (45.0%) missing data in respectively the first and second of the above mentioned treatment groups. Also, in 2 of the 3 patients having surgery as primary intervention the data were missing. In the 20 patients needing secondary surgery following primary chest tube drainage, the mean total LOS after primary intervention was 18.5 days, with 5 (25.0%) missing data (table 1).
6. MICROBIOLOGY AND VACCINATION COVERAGE

The results of blood and pleural fluid culture were available for respectively 103 (65.2%) and 141 (89.2%) patients. In 38 (24.1%) patients, a causative micro-organism was isolated from blood or pleural fluid culture. The most often isolated pathogen was \textit{S. pneumoniae}, which was found in 32 (84.2%) patients (20.3% of the total study population), followed by \textit{S. pyogenes} (n=5; 13.2%) and \textit{S. aureus} (MRSA) (n=1; 2.6%) (Figure 2).

At the moment of hospitalization, a complete vaccination with a pneumococcal conjugate vaccine (PCV) was conducted in 100 (63.3%) patients, of which 92 (92.0%) were vaccinated with PCV-7, 3 (3.0%) with PCV-13 and 5 (5.0%) with a combination of PCV-7 and PCV-13. Thirty-one (19.6%) patients were not or incompletely vaccinated at hospitalization, and in 27 (17.1%) children the vaccination status could not be retrieved. Of the 32 patients with an isolated \textit{S. pneumoniae}, 15 (46.9%) were completely vaccinated, and 13 (40.6%) were not or incompletely vaccinated with a PCV at hospitalization. For 4 (12.5%) patients data were missing (Figure 2).

Figure 1. Isolated micro-organisms and vaccination status

![Figure 1: Isolated micro-organisms and vaccination status](image)

PCV: pneumococcal conjugate vaccine
Figure 2. Flowchart management strategy of CAP complicated by parapneumonic effusion

Table 1. LOS after primary intervention

<table>
<thead>
<tr>
<th>Type of primary intervention</th>
<th>Number of patients</th>
<th>Mean LOS at PICU after primary intervention (days)</th>
<th>Mean total LOS after primary intervention (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics and chest drain without fibrinolitics</td>
<td>35</td>
<td>5.4</td>
<td>10.9</td>
</tr>
<tr>
<td>Antibiotics and chest drain with fibrinolitics</td>
<td>100</td>
<td>7.0</td>
<td>12.1</td>
</tr>
<tr>
<td>Surgical intervention</td>
<td>3</td>
<td>6.0</td>
<td>missing data</td>
</tr>
</tbody>
</table>
Table 1. LOS after primary intervention *(continued)*

<table>
<thead>
<tr>
<th>Type of primary intervention</th>
<th>Number of patients</th>
<th>Mean LOS at PICU after primary intervention (days)</th>
<th>Mean total LOS after primary intervention (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics, chest drain +/- fibrinolytics</td>
<td>20</td>
<td>14.0</td>
<td>18.5</td>
</tr>
</tbody>
</table>
DISCUSSION

First, we would like to emphasize that this is a descriptive study. It is not the intention to make a statistical comparison between the different treatment strategies.

1. MANAGEMENT STRATEGY AND OUTCOME

Based on the current literature, percutaneous thoracic drainage with or without fibrinolytics as well as VATS are accepted as primary intervention for CAP complicated by parapneumonic effusion. Proponents of early VATS state that a better and more rapid lung expansion is accomplished with this technique. Multiple retrospective studies have shown that, compared to chest tube drainage without fibrinolytics, primary or early VATS (<48h after admission) is associated with a shorter total LOS (11,12,13,14). However, other retrospective studies failed to detect a significantly different LOS when comparing VATS to chest tube drainage with or without fibrinolytics. Shah et al. (2011) (15) found no statistical significant difference in total and post-procedure LOS between the different drainage strategies (chest drain with or without fibrinolytics, VATS and thoracotomy). Also, Grisaru-Soen et al. (2013) (16) failed to detect a difference in total LOS between groups treated with VATS and conventional therapy (chest drain with fibrinolytics). Only 4 prospective studies have been conducted to compare conventional therapy with VATS. None of them found a difference in outcome between the treatment groups. One study compares chest tube drainage only with VATS, whereas the other studies compare chest tube drainage and intrapleural fibrinolytics with VATS. The first study didn’t detect a statistically significant difference in total LOS between the two treatment groups, the other 3 not in LOS after intervention. However, 2 of the 4 studies pointed out that the costs in the VATS group were significantly higher in comparison with the conventional group, and they concluded that, for economic purposes, conservative management should be the primary treatment option (17,18,19,20). Therefore, in accordance with the BTS guidelines, we opt for a conservative management strategy with intravenous antibiotics and percutaneous thoracic drainage with or without intrapleural fibrinolytics, and surgery only in case of failure of this primary intervention.

In this study, our local treatment protocol was evaluated. As shown in figure 1, the conservative management strategy was successful in most patients (n=135, 87.1%), and failed in 20 (12.7%)
patients. This result corresponds with other studies. Indeed, two retrospective studies with a study population of 169 (21) and 60 (22) patients, report a failure (defined as the need of secondary surgery) of the conventional therapy (intravenous antibiotics, thoracic drainage and intrapleural fibrinolytics) in 14.7% and 14.3% of the patients respectively. Three prospective studies report slightly different results, with a treatment failure of the conventional therapy (intravenous antibiotics, thoracic drainage and intrapleural fibrinolytics) in respectively 3 of 18 (16.6%), 4 of 41 (9.8%) and 5 of 50 (10.0%) patients (19,20,23). A possible explanation is the difference in study design, and the smaller study population.

2. MICROBIOLOGY AND VACCINATION COVERAGE

*S. pneumoniae* was the most commonly isolated micro-organism (in 20.3% of the total patient population and in 84.2% of the patients with positive cultures), and this also after the introduction of the 7-valent conjugated pneumococcal vaccine in the scheme of recommended vaccinations in Flanders in 2007, with a switch to the 13-valent conjugated pneumococcal vaccine in 2011. Our empiric antibiotic management strategy based on the BTS guidelines, with amoxicillin as the first treatment option, provides a good coverage against this micro-organism.

A first remark is the rather low vaccination coverage in the study population. Indeed, only 100 of the 158 (63.3%) patients included in this study, and 15 of the 32 (46.9%) patients with an isolated *S. pneumoniae* were completely vaccinated with a PCV at the moment of hospitalization. However, at hospitalization, some of the patients were too young to have already completed the vaccination scheme for PCV as proposed by the Superior Health Council in Belgium. Even so, we found that only 4 of the 31 (12.9%) patients with no or an incomplete vaccination at hospitalization completed the vaccination schedule with the PCV later on. A second remark is that we didn’t yet check the serotypes. It is certainly possible that the pneumococci isolated in our study are serotypes not included in the PCV. At last, a micro-organism could only be isolated in 38 (24.1%) patients. In this study, only a culture from blood and pleural fluid was performed. It is reasonable that a larger amount of micro-organisms would be isolated if more advanced techniques like PCR or serotype-specific serology were used. Moreover, the specimen for culture of the pleural fluid was mostly taken after the initiation of antibiotic therapy, thereby reducing the detection rate.
3. FURTHER RESEARCH

The identification of factors predicting the failure of conservative therapy, resulting in the need for early surgery, would contribute to the cost-effectiveness of pediatric parapneumonic effusion management strategy. To our knowledge, only one study (24) has been performed investigating this topic. In this study, the presence of symptoms for more than 7 days before hospital admission and the presence of concomitant non pulmonary medical conditions were predictive for chest tube failure. It is our intention to use our database to contribute to the identification of such predictive factors.
CONCLUSION

In our tertiary institution, conventional therapy with intravenous antibiotics and thoracic drainage with or without intrapleural fibrinolytics remains the first treatment for the management of parapneumonic effusion as a complication of CAP. Surgery was rarely the primary approach, and was reserved for those cases where lung entrapment was diagnosed. In most of the patients (87.1%) the conservative management was successful. In a small part of the patients (12.7%) there was treatment failure, and secondary surgery needed to be performed.

In our study, *S. pneumoniae* was the most isolated micro-organism. Our empiric antibiotic management strategy with amoxicillin as the first treatment option, provides a good coverage against this pathogen.
REFERENCES


1. INTRODUCTIE

‘Community-acquired’ pneumonie (CAP) is een frequent voorkomende ziekte in de pediatrische populatie, met als belangrijke complicatie het ontstaan van een parapneumonische effusie. Er bestaat een brede waaier aan therapeutische mogelijkheden. Een kleine pleurale vochtophoping kan succesvol behandeld worden met intraveneuze antibiotica. Echter, bij grotere effusies is er nood aan thoracale drainage. Drainage kan gebeuren via percutane plaatsing van een thoraxdrain, al dan niet gevolgd door instillatie met fibrinolytica, of na heelkundige ‘video-assisted thoracoscopic surgery’ (VATS). Zodra ‘entrapment’ van de long plaatsvindt zal de conservatieve aanpak dikwijls ontoereikend blijken, waardoor een chirurgische interventie zich opdringt. Een recente discussie in de literatuur handelt over het optimale tijdstip van chirurgie: primair bij een geloculeerde effusie of empyeem, of secundair bij falen van percutane pleuravochtdrainage en intrapleurale fibrinolytica.

Het doel van deze studie was een beschrijving te maken van de therapeutische aanpak en uitkomst van pediatrische parapneumonische effusie als complicatie van CAP in ons tertiair centrum over een periode van 5 jaar, om op die manier onze hierboven vermelde conservatieve aanpak te beoordelen. Een tweede doelstelling was inzicht te krijgen in het microbiologische profiel van de geïsoleerde verwekkers, om zo onze empirische antibiotische behandeling te evalueren.

2. METHODOLOGIE

Dit is een retrospectieve studie uitgevoerd bij alle patiënten tot de leeftijd van 16 jaar, die tussen 1 januari 2009 en 31 december 2013 opgenomen werden in het Universitair Ziekenhuis Gent met een klinisch significante parapneumonische effusie als complicatie van CAP in ons tertiair centrum over een periode van 5 jaar, om op die manier onze hierboven vermelde conservatieve aanpak te beoordelen. Een tweede doelstelling was inzicht te krijgen in het microbiologische profiel van de geïsoleerde verwekkers, om zo onze empirische antibiotische behandeling te evalueren.
20
de totale hospitalisatieduur werden in kaart gebracht. Vervolgens werd voor elke patiënt de
therapeutische strategie nagekeken.

Deze studie werd goedgekeurd door het ethisch comité van het Universitair Ziekenhuis Gent
(registratie nummer B670201523289).

3. RESULTATEN

In totaal werden 158 patiënten geïncludeerd, waarvan 86 jongens.

Volgende primaire interventies werden gedaan: bij de meeste patiënten (n=155, 98.1%) werd als
primaire interventie gekozen voor thoracale drainage van het pleuravocht, naast de toediening van
intraveneuze antibiotica. Bij 117 (75.5%) van hen werden tevens intrapleurale fibrinolytica
toegediend, bij de overige 38 (24.5%) patiënten niet. Bij 3 (1.9%) patiënten werd op basis van
klinische en radiologische bevindingen gekozen voor een primair chirurgische aanpak, bij allen
werd ‘entrapment’ van de long bevestigd tijdens de ingreep (figuur 1).

Bij 135 van de 155 (87.1%) patiënten met als primaire interventie intraveneuze antibiotica en
thoraxdrainage al dan niet in combinatie met fibrinolytica, bleek deze aanpak succesvol en werd
niet overgegaan tot secundaire chirurgie. Echter, bij de overige 20 (12.7%) patiënten was er nood
aan een heringreep omwille van falen van de conventionele therapie. Bij geen van de 3 patiënten
met primaire chirurgie was er nood aan een secundaire interventie. Van de 20 patiënten met
secundaire chirurgie werd er bij 3 (15.0%) nadien nog een tweede heelkundige interventie
uitgevoerd. Bij 2 van hen gebeurde dit omwille van de aanwezigheid van een bronchopleurale
fistel, bij 1 omwille van een recidief empyeem (figuur 1).

Bij de patiënten met een succesvolle behandeling bedroeg de gemiddelde hospitalisatieduur op de
afdeling Intensieve zorg Pediatrie na primaire interventie 5.4, 7.0 en 6.0 dagen in respectievelijk
de groep behandeld met antibiotica en thoraxdrainage alleen (n=35), de groep behandeld met
antibiotica, thoraxdrainage en intrapleurale fibrinolytica (n=100) en de groep behandeld met
primaire chirurgie (n=3). Bij de 20 patiënten met secundaire chirurgie was de gemiddelde
hospitalisatieduur op de afdeling Intensieve zorg Pediatrie na primaire interventie 14.0 dagen
(tabel 1).

Bij de patiënten met een succesvolle behandeling bedroeg de gemiddelde totale hospitalisatieduur
na primaire interventie 10.9 en 12.1 dagen in respectievelijk de groep behandeld met antibiotica
en thoraxdrainage alleen (n=35) en de groep behandeld met antibiotica, thoraxdrainage en intrapleurale fibrinolytica (n=100). Bij de 20 patiënten met secundaire chirurgie was de gemiddelde totale hospitalisatieduur na primaire interventie 18.5 dagen. Echter, we noteren in elke groep een groot aantal niet beschikbare gegevens (tabel 1).

Gegevens over de kweek van bloed en pleuravocht waren beschikbaar voor respectievelijk 103 (65.2%) en 141 (89.2%) patiënten. Bij 38 (24.1%) patiënten werd een micro-organisme uit de kweek van bloed of pleuravocht geïsoleerd. De meest voorkomende kiem was S. pneumoniae, die bij 32 (84.2%) patiënten werd teruggevonden. De vaccinatiestatus voor pneumokokken bleek volledig bij 100 (63.3%) patiënten. Van de 32 patiënten met een geïsoleerde S. pneumoniae waren er 15 (46.9%) volledig gevaccineerd en 13 (40.6%) niet of onvolledig gevaccineerd. Bij 4 (12.5%) patiënten waren hierover geen gegevens gekend (figuur 2).

4. DISCUSSIE

Gebaseerd op de huidige beschikbare data, zijn zowel percutane thoraxdrainage met of zonder fibrinolytica als VATS aanvaardbare primaire therapeutische strategieën voor CAP gecompliceerd door parapneumonische effusie. Wij opteren, conform de BTS richtlijnen, voor een conservatieve aanpak met primaire percutane pleuravochtdrainage al dan niet gepaard gaande met intrapleurale fibrinolytica, en pas heelkunde bij falen van deze primaire interventie.

In deze studie evalueerden we ons behandelingsprotocol. Zoals figuur 1 weergeeft, blijkt uit onze gegevens dat de conservatieve aanpak bij de meeste patiënten (n=135, 87.1%) succesvol was, ze faalde bij 20 (12.7%) patiënten. Dit komt overeen met de bevindingen uit andere studies.

S. pneumoniae werd in onze studie het vaakst geïsoleerd uit de kweken van bloed en pleuravocht (bij 20.3% van de totale patiëntenpopulatie en bij 84.2% van de patiënten met positieve kweken). Ons antibioticumbeleid gebaseerd op de BTS richtlijnen, met amoxicilline als eerstelijns empirische behandeling, zorgt voor een goede dekking van deze kiem. Een eerste bemerking is dat de vaccinatiegraad in onze studie eerder laag is. Verder werden de pneumokokken serotypes niet nagegaan. Als laatste noteren we een lage detectiegraad van mogelijke verwekkers.

Verder onderzoek dient te gebeuren naar factoren die het falen van de conventionele therapie, en dus de noodzaak tot een vroege chirurgische aanpak voorspellen, omdat dit een belangrijke
bijdrage zou leveren aan de kosteneffectiviteit van de behandelingsstrategie bij pediatrische CAP gecompliceerd door parapneumonische effusie.

5. CONCLUSIE

In ons tertiair centrum bleef conventionele therapie met intraveneuze antibiotica en percutane thoraxdrainage al dan niet in combinatie met intrapleurale fibrinolytica de eerstelijns behandeling voor een parapneumonische effusie als complicatie van CAP. Een primair chirurgische ingreep gebeurde enkel wanneer er bij aanmelding reeds sprake was van long ‘entrapment’. In de meerderheid van de gevallen (87.1%) bleek de conventionele aanpak succesvol. In een minderheid van de gevallen (12.7%) was er sprake van therapiefalen, waarbij een chirurgische ingreep noodzakelijk was.

*S. pneumoniae* bleek in onze studie het meest voorkomende geïsoleerde micro-organisme te zijn. Ons antibioticumbeleid met amoxicilline als eerstelijns empirische behandeling, zorgt voor een goede dekking van deze kiem.