Erhebungseinheit für seltene pädiatrische Erkrankungen in Deutschland

Forschungsstelle für pädiatrische Epidemiologie bei der Deutschen Gesellschaft für Kinder- und Jugendmedizin e.V.

Surveillance of pleural empyema and pleural effusions due to pneumonia in children and adolescents <18 years of age

Objectives
Surveillance of pleural empyema and complicated parapneumonic pleural effusions in children and adolescents under 18 years of age: incidence, etiology, pathogen spectrum, risk factors, treatment and clinical course.

Principal Investigator / Project Coordination

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Duration of study
Start 10/2010, End expected 12/2024

Background
Parapneumonic pleural effusion and pleural empyema (PPE/PE) in childhood and adolescence is a complication of pediatric community acquired pneumonia (pCAP). *Streptococcus pneumoniae*, *S. pyogenes* and *Staphylococcus aureus* are the most common pathogens detected. Previous studies have mainly relied on pathogen detection by culture, which, however, is significantly less sensitive compared to the use of PCR, e.g. 16S-rDNA PCR and sequencing. PCR-based pathogen detection also may detect microorganisms that are not capable to grow in culture. Especially in young children, systematic and continuously collected data on the incidence, etiology, risk factors, and therapeutic management of pleural empyema are urgently needed [1]. The study, which has been ongoing since 2010, enables the collection of relevant data on pneumococcal vaccination prevention / potential pneumococcal serotype replacement [2], and antibiotic therapy [3] of pleural empyema. In addition, invasive and surgical versus conservative management of pleural empyema was also evaluated [4]. Since 2020, the effects of the COVID-19 pandemic and the associated preventive measures on the epidemiology and etiology of PPE/PE has also been investigated.

Questions
1. How often do pleural empyema/complicated parapneumonic pleural effusions occur?
2. Which pathogens are identified in advanced diagnostics?
3. Which risk and prognostic factors (e.g. vaccination status, underlying diseases) can be identified?
4. What is the clinical course, complications and progression in relation to therapeutic management?
5. What shifts in the incidence, epidemiology and etiology of bacterial pathogens could be observed during the COVID-19 pandemic?

Case definition
- Children and adolescents up to their 18th birthday (<18 years)
- with pleural empyema or effusion requiring drainage and/or >1 week persistent effusion **due to pneumonia**
- supported by standard diagnostics (e.g. chest X-ray, ultrasound, computed tomography, or pleural drainage)

Logistics
Please report all patients according to the above case definition to ESPED via the ESPED representative of your clinic. After registration, you will receive a questionnaire collecting important clinical, diagnostic and therapeutic data. Central laboratory PCR diagnostics for pleural fluid is offered free of charge, as well as serotyping of cultured pneumococci.

Free of charge PCR diagnostics – send pleural fluid to:
[Begleitschein_Hygiene.pdf]
Prof. Christoph Schoen, University of Würzburg, Institute for Hygiene and Microbiology, Building E1, DNA laboratory, Josef-Schneider-Str. 2, 97080 Würzburg
Email: cschoen@hygiene.uni-wuerzburg.de

Free of charge pneumococci serotyping – send pneumococci identified in culture to: [Begleitschein and link NRZ]
PD Dr. Mark van der Linden, keyword: „ESPED Pleuraempyem“, National Reference Center for Streptococci at the Institute for Medical Microbiology, University Hospital RWTH-Aachen, Pauwelsstr. 30, 52074 Aachen, Email: mlinden@ukaachen.de

Literature

1) Liese JG, Schoen C, van der Linden M, et al. Changes in the incidence and bacterial aetiology of paediatric parapneumonic pleural effusions/empyema in Germany, 2010-2017: a nationwide surveillance study. Clin Microbiol Infect 2019;25(7):857-864.
2) Goettler D, Streng A, Kemmling D, et al. Increase in *Streptococcus pneumoniae* serotype 3 associated parapneumonic pleural effusion/empyema after the introduction of PCV-13 in Germany. Vaccine 2020;38(3):570-577.
3) Forster J, Piazza G, Goettler D, et al. Effect of prehospital antibiotic therapy on clinical outcome and pathogen detection in children with parapneumonic pleural effusion/pleural empyema. Pediatr Infect Dis J. 2021;40(6):544-549.
4) Segerer FJ, Seeger K, Maier A, et al. Therapy of 645 children with parapneumonic effusion and empyema – a German nationwide surveillance study. Pediatr Pulmonol 2017;52(4):540-547.