Recovery after community acquired pneumonia in children: The short and long-term consequences

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Primary objective:- To study the impact of community acquired pneumonia in children on persistent symptoms and quality of life, from admission in hospital until one year after discharge.Secondary objectives:To investigate/assess:- The association...

Ethical review	Approved WMO
Status	Pending
Health condition type	Hepatobiliary neoplasms malignant and unspecified
Study type	Observational invasive

Summary

ID

NL-OMON56675

Source
ToetsingOnline

Brief title
Recovery after pneumonia: RAP-study

Condition

- Hepatobiliary neoplasms malignant and unspecified

Synonym
community acquired pneumonia, lower respiratory tract infection

Research involving
Human

Sponsors and support

Primary sponsor: Spaarne Gasthuis
Source(s) of monetary or material Support: Spaarne Gasthuis

Intervention

Keyword: cardiac, microbiome, pneumonia, recovery

Outcome measures

Primary outcome

- Time to complete recovery from CAP. Complete recovery is defined as the child returned to his/her normal state of health, as reported by parents.

- Duration of symptoms at follow up: *cough*, *wheezing*, *problems with sleeping*, *gastrointestinal complaints*, *problems with eating*, *fatigue*, *dyspnea* and *upper respiratory tract symptoms*.

Secondary outcome

- Association between demographic, clinical and microbial factors on still having persistent symptoms at 3 months following hospital admission

- Influence of demographic, clinical and microbial factors on recurrence of CAP or other LRTI*s following hospital admission.

- Cardiac function as assessed by left systolic ventricular function, right systolic ventricular function and serum NT-proBNP and Troponin-T.

- Respiratory and gut microbiome composition including viral presence and abundance in children hospitalized for a CAP, on admission, after 5-7 days and after 4-6 weeks.

- Presence or absence of a pneumococcal bacteria in children hospitalized for a CAP, on admission and after 4-6 weeks.

- The nasal inflammatory profile, in children diagnosed with CAP, on admission and after 4-6 weeks.

- Questionnaires for possible influences of demographic, clinical and microbial

factors on persisting symptoms and QoL in children after CAP infection.

- Quantifying disease recovery by measuring 24-hour movement behaviour using

two accelerometers, one on the hip and one on the wrist, after admission and

after 4-6 weeks.

Study description

Background summary

Respiratory tract infections (RTIs) are prevalent among children, with lower respiratory tract infections (LRTIs), including pneumonia, bronchiolitis, and wheezing illness, posing significant health risks. Pneumonia, in particular, is a leading cause of morbidity and mortality in children under five years old, with a rising incidence observed in older age groups over the past year. Pneumonia is an infection of lung tissue caused by a combination of viruses and bacteria.
In some children, pneumonia leads to hospital admission with antibiotic treatment and oxygen support. When parents return with their child to the outpatient clinic, they often report that their child still has long-term symptoms, such as fatigue, reduced appetite or a change in behavior. Until now, it is unknown how long these symptoms persist. We aim to study the possible long-term symptoms of children who were admitted with community-acquired pneumonia (CAP) using questionnaires and an accelerometer.

Furthermore, we want to study the association between the composition of the microbiome, inflammatory responses and the duration of complete recovery as well as the amount of recurrent lower respiratory tract infections.
Community-acquired pneumonia (CAP) has a polymicrobial etiology, involving various viral and bacterial pathogens, primarily originating from the upper respiratory tract or nasopharynx. During a pneumonia, the balance between the bacteria in the airways (which is important for health) is disrupted: there are few good bacteria and many pathogenic bacteria. It is not yet known whether this disruption in the microbiome recovers, and whether it affects recovery after pneumonia. For example, a sustained disruption of the microbiome could increase the risk of new infections. In addition, antibiotics do not only harm the pathogenic, but also the "good" bacteria, and little is known whether the microbiome recovers after the use of antibiotics. Viruses also constitute part of the nasopharyngeal microbiome, regardless of respiratory tract infection presence and we want to study the role of viruses in recovery. Furthermore, the gut microbiota contributes to RTI pathogenesis through the gut-lung axis, modulating respiratory tract immunity.

Furthermore, the inflammatory milieu plays a crucial role in host susceptibility to infection and post-infection sequelae. Recent advancements in minimally invasive nasal sampling techniques allow for the detection of inflammatory markers associated with specific microbiota species, offering valuable insights into the pathogenesis of respiratory infections in children. We expect to gain new insights into the pathogenesis of lower respiratory tract infections. This could enable new preventive measures in future.

Additionally, we want to study whether pneumonia affects the heart function in children. Cardiac complications are common in adults with CAP, like myocardial dysfunction, new or worsening arrhythmias or myocardial infarction, with heart failure occurring in about 14% of cases. Similar complications, including myocarditis, are seen in children with COVID-19, often linked to severe inflammatory states. However, limited data exist on cardiovascular involvement in children without severe inflammation. The relationship between CAP and cardiac function in children remains unclear, warranting further investigation. Especially as heart function also affects recovery of the child and its future.

Study objective

Primary objective:
- To study the impact of community acquired pneumonia in children on persistent symptoms and quality of life, from admission in hospital until one year after discharge.

Secondary objectives:
To investigate/assess:
- The association between demographic, clinical and microbial factors on still having persistent symptoms, as defined by the parents, at 3 months.
- The association between demographic, clinical and microbial factors, on the recurrence of CAP and other LRTI*s following hospital admission.
- The cardiac function (as addressed by echocardiography and biomarkers of cardiac (dys)function) in children diagnosed with CAP during the acute illness and the convalescent period.
- The composition of the respiratory and gut microbiome, in children diagnosed with CAP, on admission, after 5-7 days and after 4-6 weeks.
- The nasal inflammatory profile, in children diagnosed with CAP, on admission, after 5-7 days and after 4-6 weeks.
- The association between demographic, clinical and microbial factors on persisting symptoms and Quality of Life (QoL), such as sleeping, appetite, motor functioning, social functioning, problem behaviour, communication, and positive and negative emotional functioning, in children after CAP infection
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Study design

Observational prospective cohort study. The health status and recovery, (defined as, the child*s health status returned to his/her normal state of health as reported by parents), of children who are hospitalized with CAP will be studied from admission until one year after discharge. If a recurrent infection occurs, defined as a new occurrence of a clinical diagnosed lower respiratory tract infection (LRTI), characterized by fever in combination with increased breathing work and breathing frequency, occurs within the first year, the follow-up period will be prolonged with one extra year with a maximum of 3 years.

Study burden and risks

Participation in this study holds no more risks than negligible risks. We believe that the risk of this study is no more than negligible for the participants since most sampling methods are non-invasive and generally accepted as fully safe. Sampling moments will take place during hospitalization, at home and on regular visits to the outpatient department. There is no personal benefit for the child or the parents.
We will follow the code of conduct relating to expressions of objection by minors participating in medical research, as stated by the CCMO.
The sampling moments including signing of the informed consent will take less than 30 minutes of participant*s time. The echocardiographic examinations will also take about 30 minutes and will be done twice (1x during admission and 1x during a regular visit 4-6 weeks after discharge).

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adolescents (12-15 years)
Children (2-11 years)
Babies and toddlers (28 days-23 months)

Inclusion criteria

• Children >= 4 weeks - < 16 years
• Diagnosed and hospitalized with CAP (community acquired pneumonia)

Exclusion criteria

Severe concomitant disease
Nosocomial infection
Language barrier

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-04-2024
Enrollment:	250

Type:	Anticipated

Medical products/devices used

Registration:	No

Ethics review

Approved WMO Date:	02-01-2024
Application type:	First submission
Review commission:	METC Amsterdam UMC
Approved WMO Date:	08-05-2024
Application type:	Amendment
Review commission:	METC Amsterdam UMC

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL70907.029.20