STANDARD TREATMENT WORKFLOW (STW)

Empyema Thoracis in Children

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Standard Treatment Workflow (STW)

EMPYEMA THORACIS IN CHILDREN

ICD-10-J86

SYMPTOMS
- Fever
- Chest pain
- Cough
- Respiratory distress
- Abdominal pain and vomiting

CAUSE OF EMPIEAMA
- Bacterial pneumonia (develop in 50-70% cases of complicated pneumonia)
- Tubercular empyema
- Chest wall trauma
- Lung Abscess / Aspiration
- Common organisms: S pneumoniae, S aureus

DEFINITION
- Presence of pus or microorganism in the pleural fluid, observed on

CLINICAL FEATURES
- Auscultation - decreased breath sounds & crackles
- Dullness to percussion

TREATMENT
- Child not sick; investigation reveals a small effusion - IV fluids, Oxygen, IV Antibiotics, Analgesics
- Child looks sick; investigation reveals larger effusions & respiratory compromise - IV Antibiotics and Intercostal Chest tube Drainage
- Antibiotics - 3rd Gen Cephalosporine/Extended Penicillins like Ce-Amoxiclav, for 1-4 weeks
- Change based on cultures, Continue until afebrile, ICD removed

ICD INSERTION
Agrawala S, et al.: Empyema Thoracis in Children

**Standard Treatment Workflow (STW)**

**ICD-10-J86**

**EMPYEMA THORACIS IN CHILDREN**

**CLINICAL FEATURES**
- Fever
- Chest pain
- Cough
- Respiratory distress
- Abdominal pain and vomiting
- Nausea
- Vomiting
- Hypo-/hyperthermia

**SYMPTOMS**
- Dyspnea
- Decreased breath sounds & crackles
- Dullness to percussion

**STEPS**
- Aspiration
- 清除胸腔内积液
- 病理检查

**CAUSIS OF EMPYEMA**
- Elective pneumonitis (develop in 50-70% cases of complicated pneumonitis)
- Tuberculosis empyema
- Other causes: Lung Abscess, Application of thoracostomy, Common organ abscess, Spleen abscess, Serosal string, and granuloma

**TREATMENT**
- Child needs investigation, reveals a small effusion; IV fluids, Oxygen, Antibiotics, Analgesics (if needed)
- Most cases reveal a larger effusion, reveals larger effusions & respiratory compromise
- IV Antibiotics and Intercoastal Chest Tube Drainage
- Empyema: 3rd Gen. Cephalosporin + extended Penicillin (like Co-Ampiclox), for 3 weeks
- Change based on cultures, continue until effusion (ICD) removed

**ICD INSERTION**
- Adhesion to the right under USG guidance in the mid clavicular line through the 4th intercostal space, anterior to the heart, in the first 2 weeks
- Needle aspiration: Confirmation of pus and insertion of tube may be done
- Minimum fluid to be drained: 10ml/kg in small children, 15ml/kg in older children
- Tube to be removed at complete clinical resolution or changed when blocked

**SIDE EFFECTS**
- Thoracostomy/pleural fluid accumulation
- Indications for surgery:
  - Failure of ICD therapy
  - Persistent cough over 7 days of antibiotics, persistent drainage despite chest tube drainage or complex or delayed effusion with loculation

**THORACOSCOPY VS THORACOTOMY**
- Thoracotomy: Formal thoracotomy and decortication in Stage 3 and delayed cases where there is
  - Thick pleural fluid
  - Thick exudative pleurisy
  - Inability to develop a pleural window
  - Complex and chronic empyema
  - Underlying diseased lung

**ALGORITHM OF MANAGEMENT OF CHILDHOOD EMPYEMA**

1. **Thick fluid empyema**
   - X-ray Chest - suggests significant effusion
   - No effusion or fluid
   - Check USG for empyema: Effusion present
   - Pediatric surgery consultation for ICD insertion or refer to Higher centre

2. **Simple empyema**
   - ICD aspiration/Antibiotics
   - CECT & VATS if thick pleural effusion

**REFERENCES**


**FIBROINFLUCCIC IN STAGE II EMPYEMA**
- Safe and cost-effective treatment modality that avoids surgery

- Indications
  - Within 2 weeks duration
  - Preferably no ICD has been placed
  - Imaging shows echogenic collection with septation
  - Fluid analysis shows frank pus or sterile effusion
  - Fluid analysis shows frank pus or sterile effusion

- Contraindications
  - Bleeding diathesis
  - Suspected TBC
  - Hypersensitivity to fibrinolytic
  - Complicated pneumonic lung abscess
  - Air leak on insertion of ICD

**PROCEDURE**
- 2% lidocaine ICD: Insert ICD kept blocked for 4 minutes (ICD reconnected after 3 minutes)
- Children are encouraged to change their clothing

**MONITORING**
- Resolution of clinical symptoms: fever, tachypnoea
- Drain output: Daily USG & X-ray

**ICD IS REMOVED**
- Drain output is <10ml/hour, chest X-ray shows good expansion
- Discharged with standard antibiotic cover for 2-2 weeks

**Failure/Indication for Surgery**
- Persistence of collection on ultrasound after 3 days
- Clinical/Radiological worsening during therapy

**STAY HIGH FOR INVASIVE PROCEDURES**

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