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Physiotherapeutic management of right-sided pleural effusion in a pediatric patient with hydropneumothorax: A case report

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Abstract
Pleural effusion and hydropneumothorax in pediatric patients pose serious respiratory challenges requiring multidisciplinary intervention. This case report highlights the physiotherapeutic management of a 13-year-old female presenting with right-sided pleural effusion secondary to hydropneumothorax. Early chest physiotherapy interventions, including airway clearance techniques, breathing exercises, and upper limb mobility training, played a crucial role in the patient's recovery.

Keywords: Pediatric pleural effusion, Hydropneumothorax, Chest physiotherapy, Airway clearance techniques, Upper limb mobility training

Introduction
Pleural effusion in pediatric populations, especially when associated with infections or trauma, can lead to compromised respiratory function. When accompanied by hydropneumothorax, the clinical condition becomes more critical, often necessitating Intercostal Chest Drainage (ICD). Timely physiotherapy can aid in lung re-expansion, secretion clearance, and functional recovery. This case illustrates a multidisciplinary approach to treating a child with pleural complications.

Patient Information
Name: Reeta Damor
Age: 13 years
Sex: Female
Address: Madhya Pradesh
Informants: Parents
Presenting Complaints
Pain at ICD site (right posterior side)
Decreased movement of right upper limb History of cough, cold, and breathlessness for 10–12 days

History of Present Illness
The patient had been experiencing symptoms of cough, cold, and breathlessness for over 10 days. She was admitted to Dahod Civil Hospital and later transferred to DNH hospital on February 21st. She had complaints of right-sided chest pain, vomiting after feeds, and fever. A pleural tap and insertion of an ICD were performed on the same day. At present, she is afebrile and has no cough, vomiting, or visible chest swelling.

Past Medical History
Five months prior, the patient was admitted for eight days due to fever and cough.

Birth History
Full-term normal delivery at home
Birth weight: Not known

Family History
No significant family history noted.

Vaccination History
Not properly known as per parents; BCG scar is present.

Developmental History
All developmental milestones were achieved on time.

Socioeconomic Status
Poor condition

Clinical Examination
Moderately built, playful, oriented child with monosyllabic speech. No signs of clubbing, cyanosis, pallor, or facial dysmorphism. Scar over xiphisternum and burn mark on right chest noted.

Chest Examination
ICD inserted at right side, 6th intercostal space. HR: 115 bpm, RR: 40/min. Abdominothoracic breathing pattern, depressed lower sternum, and flaring of lower ribs. Decreased air entry on right side. Productive cough.

Investigations
Chest X-ray (2nd Feb): Right-sided pleural effusion
5th Feb: Right-sided hydropneumothorax with mediastinal shifting
21st Feb: Right-sided pleural effusion with ICD in situ

Assessment
Diagnosis: Impaired lung function due to hydropneumothorax
Problem List:
- Right lower lobe pleural effusion
- Decreased lung expansion
- Post-ICD pain
- Reduced chest mobility
- Upper limb functional limitations

Physiotherapy Management
1. **Positioning**
   - Head-up and side-lying to improve ventilation-perfusion ratio.
2. **Breathing Exercises**
   - Diaphragmatic breathing

- Segmental expansion breathing
- Incentive spirometry (if available)
- Paper/tissue blowing games to promote deep breathing

3. Airway Clearance
- Voluntary coughing with support
- Tracheal stimulation to initiate cough
- Huffing techniques

4. Chest Physiotherapy
- Manual vibrations during expiration
- Percussion if tolerated
- Manual stretches at the end of inspiration

5. Upper Limb Mobility
- Active-assisted exercises for the right upper limb
- Shoulder protraction/retraction
- Wall climbing and stick exercises

6. Functional Re-education
- Sitting balance
- Bed mobility and progression to ambulation Sessions were conducted twice daily initially, then reduced to once daily as condition improved. Pain management and family education were integral to the rehabilitation.

Outcome
The patient showed improvement in chest expansion, pain reduction at the ICD site, and increased upper limb mobility. She responded well to physiotherapy with better secretion clearance and respiratory function.

Discussion
Hydropneumothorax with pleural effusion in children is a rare yet serious condition requiring immediate intervention. ICD placement is standard, but recovery is significantly improved through early chest physiotherapy. Positioning, breathing retraining, and mobilization form the crux of conservative pulmonary rehabilitation in pediatric care.

Conclusion
Early and targeted physiotherapy can significantly contribute to recovery in pediatric patients with pleural effusion and hydropneumothorax. This case emphasizes the importance of physiotherapeutic intervention post-ICD placement in restoring lung function and quality of life.

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