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Case of the month

12 year old child with sudden onset respiratory distress and "hydropneumothorax"- should we place a chest tube or a nasogastric tube?

Nivedita Mondal
Narayanan Parameswaran
Rashi S.Rustagi

We report the case of a previously asymptomatic girl who at the age of 12 years of age presents for the first time with acute onset respiratory distress. Initially treated as a case of hydropneumothorax she was found to have eventration of the left diaphragm.

CASE REPORT

A twelve years old girl presented to the pediatric emergency with complaints of abdominal pain of one day duration associated with 3 episodes of non bilious vomiting. She also complained of breathlessness which had developed about 15 hours after the onset of abdominal pain. There was no history of fever, cough with expectoration or chest pain. She was not a known asthmatic and denied any history of trauma to the chest. She reported mild periumbilical pain occurring on and off for the preceeding 6 months which had been treated as 'ulcer disease' with oral medications; apart from this there had been no significant medical events in the past. With these symptoms, she was seen at a local hospital where a chest radiograph revealed left sided hydropneumothorax for which an intercostal drain (ICD) was inserted. Since there was no improvement in her symptoms, she was referred to our hospital for further management. The child presented to our emergency room about 11 hours after the onset of breathlessness. On examination she was conscious and oriented. Her vital signs at admission were pulse rate 150/minute with low pulse volume, blood pressure 110/70 mm Hg and respiratory rate of 80/minute. She had significant respiratory distress with grunting and nasal flaring with SpO_2 of 95 % on oxygen by mask. Her trachea was shifted to the right; movements of the chest were markedly diminished on the left. Breath sounds on the entire left hemi thorax were significantly reduced with stony dullness on percussion. Examination of the right hemi thorax was normal. Abdominal examination revealed a soft, non-tender abdomen with no organomegaly. The left side ICD was in-situ; it however had ceased functioning. In view of increasing respiratory distress, she was electively intubated and connected to the ventilator. She required high pressure settings to achieve adequate chest expansion PEEP: 10 cm H2O, PIP: 35 cm H2O). The chest X-ray taken after the ICD showed air fluid level with ICD in situ (Figure 1). The diaphragm was not clearly visible on the left. However on careful observation the upper limit of air was found to be 2 intercostal spaces below the apex; an observation inconsistent with a diagnosis of hydropneumothorax. A nasogastric tube was inserted with some difficulty through which about one litre of brownish fluid was aspirated. With decompression of the stomach

Author's affiliation: Department of Pediatrics, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry, India.

Reprint's request: Dr. Narayanan Parameswaran, Assistant Professor, Department of Pediatrics, JIPMER, Pondicherry-605006, India. E-mail: narayanan@jipmer.net.

the child's respiratory distress markedly improved and her ventilator pressure settings could be brought down significantly (PEEP: 7, PIP: 24). A chest radiograph after instillation of water soluble contrast through the nasogastric tube revealed displacement of left hemidiaphram and stomach into the thoracic cavity (figure 2). Considering a diagnosis of eventration of left diagphram with possible gastric volvulus, she was taken up for surgery. Intra operatively, she was found to have eventration of left diagphram. The stomach, spleen and greater omentum were occupying the left hemithorax and compressing the left lung. A 0.5 X 0.5 cm perforation was found in the posterior surface of the body of the stomach which most probably was a result of the ICD insertion. The post operative period was relatively uneventful except for a nosocomial pneumonia which was managed with antibiotics. The child was extubated on 4^{th} post operative day and oral feeds was started 9 days after surgery.

DISCUSSION

Eventration of diaphragm refers to the abnormal elevation of a part or the whole of the hemi diaphragm. It is a rare anomaly with an incidence of 1 in 10,000 live births.[1] The condition may be congenital or acquired. Congenital eventration results from the incomplete development of the central tendon or muscular portion of the diaphragm or absence of the phrenic nerves. Acquired cases are usually due to interruption of the phrenic nerve following a traumatic birth like during breech delivery, thoracic operation for a congenital heart lesion leading to phrenic nerve paralysis or neoplastic infiltration. The condition has been reported in all age groups, though very infrequently in older individuals as compared to the pediatric age group. [1,2,3] The clinical manifestations and management remain the same in both types.

Eventration may be asymptomatic even in the presence of a large defect. If symptomatic, respiratory symptoms predominate as the weakened diaphragmatic muscle results in an upward displacement of abdominal contents into an outpouching of the diaphragm, resulting in respiratory compromise which may be severe enough to warrant mechanical ventilation. A child may present in the neonatal period with severe respiratory distress on day 1 or may present later in infancy with recurrent chest infections, broncheictasis and failure to thrive. Occasionally the presentation may be delayed till late childhood when the child suddenly develops gastrointestinal symptoms of abdominal pain and vomiting due to gastric volvulus as we have observed in our child.[4]

Eventration is often missed as it is not considered in the differential diagnosis of older children presenting with respiratory symptoms. The differential diagnoses entertained in these children are common respiratory conditions like pneumothorax, hydropneumothorax, pleural effusion etc. The chest radiograph may reveal an elevated dome of the diaphragm which retains its continuity and attachments to the costal margin; a feature which differentiates it from diaphragmatic hernia where this continuity between the diaphragm and the costal margin is disrupted. In case of hydropneumothorax, the upper border of the air column usually extends till the lung apex. If that is not the case, then an alternative diagnosis should be entertained. Radiograph after contrast administration, fluoroscopy, ultrasonogram and computed tomographic scan are other modalities that may help in the diagnosis. In case of gastric volvulus, decompression with nasogastric tube may relieve the symptoms and may be life saving as observed in our child. Treatment is required only in symptomatic cases and is done by plication either by thoracotomy or laparotomy.[4]

The present case underscores the importance of careful clinical and radiological assessment in all cases of respiratory distress presenting in the pediatric emergency. The absence of prior respiratory symptoms and fever and the atypical appearance of the hydropneumothorax should have raised the suspicion of an alternative diagnosis. The ICD insertion resulted in a complication (perforation of stomach) which could have been avoided if careful attention was paid to the chest radiograph. All emergency physicians should be aware of surgical conditions like eventration and consider them in the differential diagnosis while evaluating any child with respiratory distress.

Abbreviations

PEEP: Positive End Expiratory Pressure

PIP: Peak Inspiratory Pressure

REFERENCES

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Fig 1: Chest X ray after ICD insertion showing air fluid level with ICD in situ

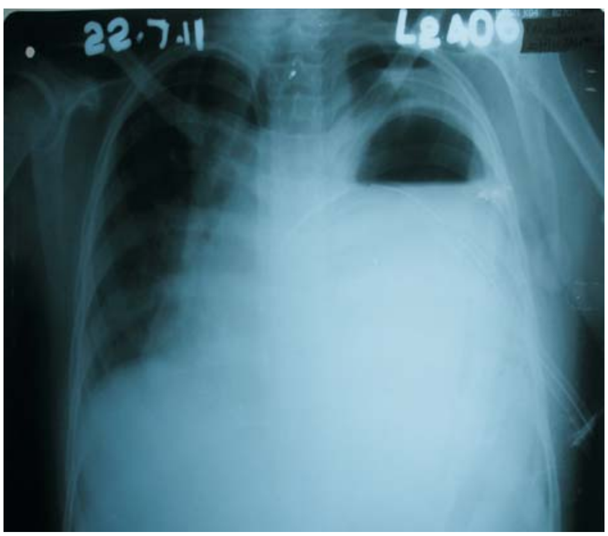
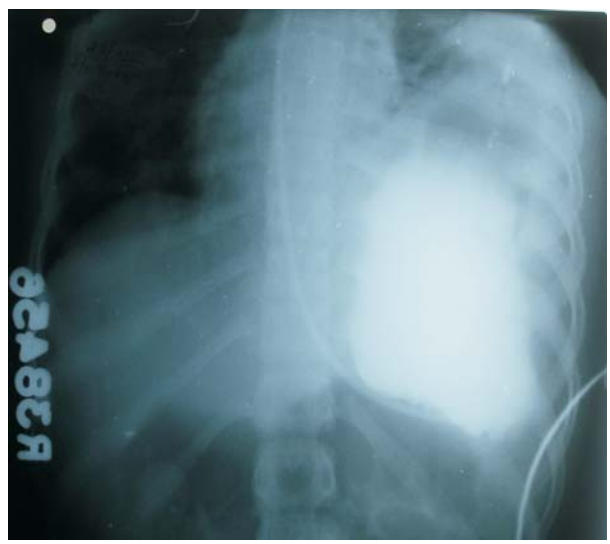


Fig 2: Contrast study showing left sided eventration of diaphragm.



Upcoming events

6th March	Pediatric Endocrinology Conclave -Trivandrum - **Dr. I. Riyaz** - 94471 50183
13th March	State Level CME on Infectious Diseases in children & State IAP infectious Diseases
	Chapter Annual Conference - Kozhikode - **Dr. Suresh Kumar E.K -** 9895078820
20th March	Birth Defect Registry &Down syndrome State Level Programme - Kollam -
	Dr. Anil Tharian - 94473 64245
26th March	Lifestyle Diseases Prevention TOT & IAP Kerala state executive - Trivandrum CDC -
	Dr. I. Riyaz - 94471 50183
27th March	CME on prenatal diagnosis- AIMS Cochin - **Dr. Sheela Nampoothiri** - 94479 78222
3rd April	Birth Defect Registry & CME on prenatal diagnosis - Calicut –
	Dr. Mohandas Nair - 94471 91560
17th April	State Level CME program on Vaccinology & honoring National Presidents
	Dr. T.U. Sukumaran & Dr. M.K.C. Nair - Malappuram - Manjeri -
	Dr. Joshi K.K. 9447126399; **Dr. Shibu Kizhakkathara** - 94465 34242
29-30 April	National Workshop on Art & Science in Paper Writing - Kottayam
	Dr. C. Jayakumar - 94460 53602
1st May	State conference of IAP Neurology Chapter - Palakkad –
	Dr. Sanjeevkumar - 9447483770
22th May	State Level CME on Child hood Disability, formation of State IAP Disability Chapter &
	New born hearing workshop - Trivandrum -
	Dr. Mohammed Kunju - 94472 46333; **Dr. I. Riyaz** - 94471 50183
4-5th June	SUMMER PEDICON 2011 - IMA House, Kochi - **Dr. S. S. Kammath** - 98470 57766
12th June	TOT on Mental Health and Child Abuse - Thalassery –
	Dr. Santhosh M.K. - 9447017806
19th June	National Environment & Child Health Group Conference - Thiruvalla
	Dr. Remesh Kumar – 9447457594
4th sep.	State IAP Nutritional Chapter Conference –Trivandrum –
	Dr. Elizabeth.K.E. -9496260420
17-18th sep..	National IAP Adolescent Conference ADOLESCON 2011] - Kozhikode
	Dr. Beena Johnson - 98472 19390
1-2nd Oct.	IAP Respiratory Chapter Conference [RESPICON2011]-TRIVANDRUM-
	Dr. Santhosh Kumar-9387801945 / **Dr. Bennet Xylem** -9447230557
4-6 Nov.	SOUTH PEDICON 2011 - Angamaly - **Dr. Shimmy Paulose** - 9895272071
19-20th Nov.	National IAP Nephrology Conference - Trivandrum –
	Dr. Susan Uthup - 94473 09239
25-27th Nov.	National IAP Adolescent Endocrinology Conference - Kozhikode
	Dr. Vijayakumar .M- 94470 71637