

Thoracoscopic Diaphragmatic Plication for Eventration in Pregnant Woman: A Case Report

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ABSTRACT

Diaphragmatic eventration is an uncommon malady, underdiagnosed and often treated only in emergent situations. Eventration of the diaphragm is best treated by plication of diaphragm with or without meshplasty. Various studies have shown that thoracoscopic plication is as efficient as laparotomy or laparoscopic plication. We present here the report of thoracoscopic diaphragmatic plication for eventration performed in the third trimester of pregnancy in a 28-year-old woman who presented with acute respiratory distress. To our knowledge, we believe this to be the first published case in medical literature.

Keywords: Endoscopy, Glottic web, Laryngoscopy, Voice quality

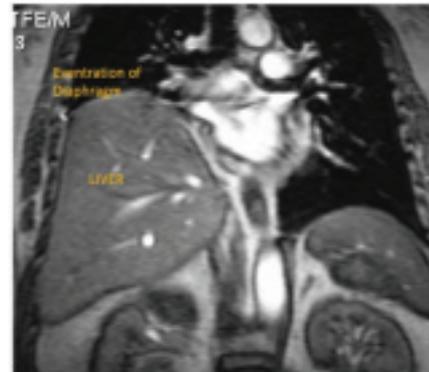
CASE REPORT

A 28-year-old woman presented to her physician, at 30 weeks of pregnancy, with acute respiratory distress. Decreased breath sounds in the right half of the chest engendered a limited screening with MRI showing a huge eventration of the right dome of the diaphragm, with liver occupying a significant part of the right thoracic cavity, compressing the lung and a partial mediastinal shift to the left [Table/Fig-1]. She was managed conservatively by bed rest and head end elevation and discharged after three days.

Within a week, she developed acute respiratory distress again, ICU admission was done and was then referred to our center for evaluation and management. Allowing the pregnancy to continue without repair of the eventration would cause further attacks of acute respiratory distress with danger to the mother and the child. Various surgical options were therefore discussed. A laparotomy and diaphragmatic plication is the most common technique, but carries a fairly high morbidity to the mother and a possible mortality to the child. Laparoscopic diaphragmatic eventration or patchplasty was another option, but with arguable risks in pregnancy. The other possibility was a thoracoscopic diaphragmatic plication, safe to both. Literature revealed no published reports of an attempt. We explained our plan of action to the patient, who consented and we thus proceeded.

With the thoracic surgeons, the neonatologists (baby's heart rate with cardiocotogram), the obstetricians (uterine contractions), the pulmonologist and anaesthetist (blood gases and oxygen saturation monitoring) and the patient in steep left lateral position, we proceeded with the three port technique with the third, fourth and fifth spaces using the posterior, middle and anterior axillary lines. As we progressively insufflated with carbon dioxide, we noticed infant bradycardia on the cardiocotogram on four occasions, forcing us to stop insufflation, after a wait for a few minutes we restarted with lower carbon dioxide pressures. By using a fourth port to hold down the liver and using steep head up position to allow the liver to gravitate downwards and away from the chest, we commenced the suturing of the floppy diaphragm [Table/Fig-2] and plication with 1-0 polypropylene sutures done as three rows of sutures, anterior to posterior, with bites of ½ cm of diaphragm on either side [Table/Fig-3]. When we had completed the antero-posterior rows of suturing, the diaphragm looked taut and there was no liver

bulging upwards. An intercostal drainage was left through the fourth intercostal port and we exited with a normal cardiocotogram and blood gas report. Postoperatively, we ventilated the patient for a 12-hour period. Throughout, the mother and the baby were monitored and they were very well, with fourth postoperative day discharge.



[Table/Fig-1]: Chest MRI showing a huge eventration of the right dome of the diaphragm.



[Table/Fig-2]: Eventration.



[Table/Fig-3]: Thoracoscopic plication.

Two months later a healthy term baby was born through a caesarean section, as advised by the obstetricians to avoid burst of the diaphragmatic sutures during labour.

DISCUSSION

Diaphragmatic eventration is a developmental defect wherein the muscular portion of the diaphragm appears membranous and thinned out [1,2]. This can be unilateral (left is frequent) or bilateral [3]. Commonly, an eventration is picked up during an incidental chest X-Ray and referred for surgical correction [4]. Our patient's symptoms had progressively worsened by the increased intra-abdominal pressure of pregnancy.

If the diaphragm is not too thin, plication itself gives the diaphragmatic muscle the tautness of a stretched sheet across the torso, to act as a 'Windlass' for ventilation [5]. If the plication is not efficiently done or the muscle very transparent, one needs to add on a mesh to the rim of the diaphragm to strengthen the repair. In our case, we were happy with the appearance of the diaphragm at the end of plication.

Diaphragmatic hernia in pregnancy can be managed by various techniques [6]. Thoracotomy and diaphragmatic plication have been reported by Pilsczek FH et al., without major morbidity and mortality [7]. Conservative management has been reported by Pandey D et al., [8]. Preterm delivery and postpartum hernia repair have been described by Ngai I et al., [9]. Laparoscopic reduction of incarcerated bowel and diaphragmatic hernia repair has also been described by Debergh I et al., [10].

We chose thoracoscopic route for the following reasons:

1. In terms of the morbidity and even a small mortality, the thoracoscopic alternative is accepted as better than a thoracotomy.
2. Similarly, a laparotomy, carrying both maternal and fetal morbidity and mortality is best avoided in pregnancy when it may precipitate labour or fetal death.
3. With conservative treatment of recurrent episodes of acute respiratory distress, the need for repeated admission/ventilation would have undoubtedly appeared.

Earlier reports indicated that laparoscopy during pregnancy during all trimesters, carried a slightly higher rate of fetal death, because of the carbon dioxide challenge. In recent years there has been

an increasing tendency to accept the safety of laparoscopy in all trimesters of pregnancy (SAGES guidelines 2007).

Many studies have shown that thoracoscopic plication is as efficient as abdominal laparotomy or laparoscopic plication [11].

We insufflated the CO₂ through the thoracic cavity without significant increase of intra-abdominal pressure and with decreased danger and risk to the fetus and the mother and this was vital to success.

CONCLUSION

This case report of thoracoscopic plication of diaphragm, might well pave the way for next generation surgeons to adopt this less invasive technique of fixing a problem that comes up during the difficult management period of pregnancy. This is the first published case report in medical literature of a pregnant woman undergoing a thoracoscopic plication for eventration of the right diaphragm, with a favourable result for mother and child.

Local Institutional Review Board (IRB) was informed about the procedure and due approval was obtained.

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