

Prediction for emergency balloon removal after fetoscopic endoluminal tracheal occlusion for congenital diaphragmatic hernia

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Objective

In case of congenital diaphragmatic hernia (CDH), Fetoscopic Endoluminal Tracheal Occlusion (FETO) can provide important benefits to the baby but it increases the risk of PPROM and preterm labor. Balloon removal can be a life-threatening emergency that requires complex multidisciplinary care coordination. To determine predictive factors for the need of emergency FETO balloon removal.

Methods

Retrospective analysis of CDH fetuses who underwent FETO at two centers (USA and France) between 01/2015 and 12/2022. Similar patient selection criteria was used at both centers. Balloon placement was scheduled for 26-32 weeks and removal for 34-35 weeks. If there was any clinical situation that prompted to proceed before that scheduled time, it was considered an "emergency balloon removal". Comparison of clinical and surgical parameters between cases who underwent an emergency vs scheduled removal were performed.

Results

68 FETO cases were included. CDH characteristics were similar between both groups. Emergency removal was required in 29.4% cases, 3.6 [0.7-6.4] weeks after balloon placement, using a fetoscopic approach (7/20[35%]), by percutaneous puncture (5/20[25%]) or by EXIT (8/20[40%]). Elective removals occurred in 48/68 (70.58%) of cases with a longer FETO interval [5.6(2.6-8.7) weeks, $p<0.01$]. Fetoscopically access was more frequent (42/48[87.5%]); $p<0.01$, but percutaneous puncture (3/48[6.3%]) and EXIT (3/48[6.3%]) methods were also used. Overall, the rate of PPROM was similar between both groups [Emergency: 11/20(55%) vs. Scheduled: 22/48(45.8%), $p=0.54$], but occurred earlier in the emergency removal group [33.4(30.4-35) vs. 35.4(28.4-36.7) weeks, $p<0.01$] with higher rates of PPROM before 34 weeks [8/11(72.7%) vs. 2/22(9.1%), $p<0.01$]. No differences in known risk factors for preterm birth or PPROM such as cervical length, polyhydramnios or chorioamniotic separation were observed. No differences in FETO surgical times were observed either. Other indications for emergency balloon removal included: fetal distress [3/20(15%)], suspected abruption [3/20(15%)], preterm labor [2/20(10%)] and eclamptic seizure [1/20(5%)]. Patients in the emergent balloon removal group delivered earlier [33.4(30.4-35) vs. 36.1(33.6-40.1) weeks, $p<0.01$] and more frequently by cesarean delivery [18/20(90%) vs 18/48(37.5%), $p<0.01$].

Conclusion

Our study shows how early PPROM was the main difference between both groups that led to an emergent balloon removal after FETO. Further research is needed in order to understand the underlying mechanisms that can lead to this high-risk clinical situation.