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Per Oral Endoscopic Myotomy in pregnancy

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ABSTRACT

Objective: To report the first successful full-term delivery following Per Oral Endoscopic Myotomy (POEM) performed during pregnancy.

Methods/Background: Achalasia is an esophageal motility disorder characterized by dysphagia, regurgitation, reflux, recurrent vomiting, and weight loss. Achalasia in pregnancy can affect nutritional status of the mother, and subsequently, the child, increasing morbidity and creating potential pregnancy complications. POEM is a novel endoscopic procedure which involves cutting the lower esophageal sphincter to allow food to pass, and is considered a safe and effective management option for achalasia in non-pregnant individuals.

Results: We discuss the case of a patient with achalasia and a prior Heller myotomy who presented with recrudescence of severe symptoms prompting evaluation and treatment with POEM.

Conclusion: This is the first report of successful full-term delivery following POEM performed during pregnancy, demonstrating its feasibility and safety in this patient population when approached with a multidisciplinary team.

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KEYWORDS

Achalasia; pregnancy; per oral endoscopic myotomy

Introduction

Achalasia is an esophageal motility disorder characterized by dysphagia, regurgitation, reflux, recurrent vomiting, and weight loss. Achalasia in pregnancy can affect nutritional status of the mother, and subsequently, the child, increasing morbidity and creating potential pregnancy complications [1,2]. Minimal literature exists on management options in this population [1–3]. Per Oral Endoscopic Myotomy (POEM) is a novel endoscopic procedure which involves cutting the lower esophageal sphincter (LES) to allow food to pass, and is considered a safe and effective management option for achalasia in non-pregnant individuals [4]. The objective of this study was to report the first successful full-term delivery following POEM procedure performed in pregnancy to our knowledge.

Materials and methods

A 37 year old gravida 3 para 1011 with achalasia presented for prenatal care in her first trimester. Her obstetrical history included a prior emergency

cesarean delivery at 40 weeks gestation for non-reassuring fetal heart tracing. Eight years prior she underwent a Heller myotomy with Dor fundoplication, a surgical procedure that divides the muscle layer from the esophagus down to the stomach, for management of her achalasia. 6 months prior she had pneumatic dilation to 15 mm. However, further dilation was not attempted given resistance. Given the typically un-sustained response with pneumatic dilation and the time-frame during the pregnancy when she presented, a more definitive approach *via* POEM was planned. The exact achalasia subtype could not be categorized given her prior surgical history. Her early pregnancy course was complicated by significant nausea, vomiting and solid food dysphagia which was managed with antiemetics and nutritional supplements. She had absent contractility on her manometry, though an exact achalasia subtype cannot be categorized given her prior surgery. Her total Eckhardt score was 11/12: dysphagia to solids and liquids- 3, regurgitation- 2, retrosternal chest pain- 3, weight changes- 3. Despite these supportive measures, she lost 11 pounds in her

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first trimester from a pre-pregnancy BMI of 19 kg/m². Given her findings on motility studies, these symptoms were attributed to the severity of her achalasia. All management options were discussed with her primary gastroenterologist, including gastrostomy tube placement, total parenteral nutrition therapy, repeat Heller myotomy, esophageal stent placement and POEM. After understanding risks and benefits of all available treatments, she still strongly desired to undergo POEM.

Results

In coordination with MFM, GI, and anesthesia, the patient underwent an uncomplicated POEM at 18 weeks and 6 days. The patient was consented on risk, benefits, and alternatives prior to the procedure and imaging. Endoscopy was performed prior to POEM demonstrated a dilated, debris-filled esophagus with nodular, friable mucosa in the lower third of the esophagus. There was no stricture but resistance to passing the scope through the LES prompting a step-wise dilation from 12 mm to 15 mm. There was presence of a prior partial fundoplication. Barium swallow pre-POEM demonstrated esophageal dysmotility with slightly delayed transit across the esophagus and post-operative changes of Heller myotomy and fundoplication with a narrow column of contrast across the fundoplication. The POEM was uncomplicated. A posterior myotomy was not performed and sling fibers were dissected during the procedure. General anesthesia was per protocol. Electrocautery was minimized as in all cases (used for creation of the submucosal tunnel and coagulation of vessels). Esophagram one day post-POEM demonstrated expected post-procedure changes of mucosal irregularities in the distal esophagus and some stasis, dysmotility and distal esophageal dilation. Contrast passed easily into the stomach in the upright position. Fetal doppleres were performed preoperatively and postoperatively. She was admitted postoperatively for close monitoring. Her diet was advanced slowly, and she reported improved symptoms. Barium esophagram evaluating for postoperative esophageal leak was negative and she was discharged home on postoperative day 1 with close follow up. A planned third trimester growth US was performed at 32 weeks, diagnosing fetal growth restriction (FGR) at the 3rd percentile with an elevated umbilical artery pulsatility index. She underwent careful antenatal surveillance for this during the remainder of the pregnancy with serial growth ultrasounds and nonstress tests. She received betamethasone at 33 + 4/7ths

weeks due to non-reassuring fetal testing. She reported nausea, vomiting, and dysphagia that waxed and waned throughout the last few weeks of her pregnancy and ultimately delivered *via* repeat cesarean at 37 weeks for FGR. Total net weight gain during the pregnancy was 3 lbs with a final weight of 130 lbs. Starting weight was 127 lbs with recorded nadir of 122 lbs and patient reported nadir of 112 lbs. Due to worsening reflux, inability to tolerate a supine position and to decrease the risk of intraoperative aspiration, a nasoesophageal tube was placed preoperative to remove any contents collected in the esophagus and removed intraoperatively. The cesarean delivery was performed with regional anesthesia, with head of bed slightly elevated to prevent reflux. A baby girl was delivered weighing 2290 g (5 lbs 0.8 oz) with APGARS 8 and 9 at 1 and 5 min, respectively. The patient desired permanent sterilization at the time of delivery and underwent a bilateral salpingectomy.

Her postoperative course was uncomplicated. She tolerated her solid diet and had no issues related to reflux or aspiration following the delivery. She was discharged home on postoperative day 2. At 6 weeks follow up, both the mother and the baby are doing well, and the baby is meeting milestones. A follow up endoscopy was not performed *given resolution of symptoms and expected findings on imaging post-POEM*.

Discussion

This is the first report of successful full-term delivery following a POEM procedure performed in pregnancy to our knowledge. Previously, symptomatic management was recommended during pregnancy with a plan for definitive treatment after delivery [1]. There is one case report of POEM performed during pregnancy that did not report pregnancy outcome [2]. However, the authors were able to provide the additional delivery information after publication of a successful vaginal delivery at 38 weeks gestation as listed in Table 1. For other types of definitive management of achalasia in pregnancy, there is one report of Laparoscopic Heller Myotomy during pregnancy that did not report gestational age at time of delivery [5]. POEM in pregnancy is feasible and may be considered an option for definitive management of achalasia in pregnancy. Close fetal monitoring and multidisciplinary management were essential in this case and should be considered in future cases for optimal outcomes. Verbal consent to publish this case was obtained by the patient.

Table 1. POEM in pregnancy outcomes.

Publication (author, year)	Age (years)	Gestational age at time of POEM (weeks + days)	Pregnancy Complication	Pregnancy Outcome (weeks + days)
Smirnov, 2021 [2]	30	16	Polyhydramnios at 30 weeks	Spontaneous Vaginal Delivery at 38 + 0
(present study)	37	18 + 6	Fetal Growth Restriction 3rd percentile at 32 weeks Elevated umbilical artery dopplers at 33 weeks	Repeat cesarean delivery at 37 + 0

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