Case Report

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Giant Ventral Hernia in a Pregnant Patient

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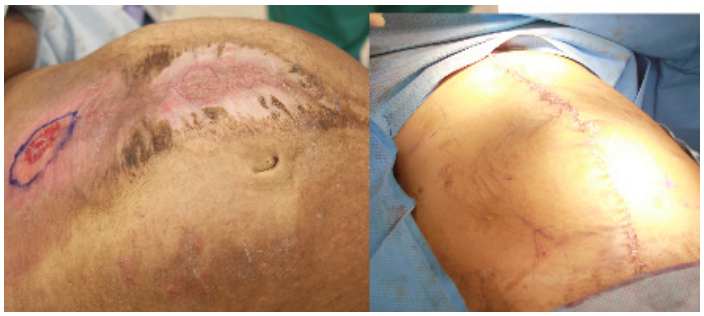
Introduction

Large abdominal wall defects can occur as a result of temporary abdominal closure (TAC). TAC is used in critically ill patients where the abdominal wall cannot be closed due to intraabdominal hypertension, loss of domain (LOD), and other devastating abdominal conditions. Clinically, TAC is similar to giant ventral hernias (GVH) in that both have large facial defects. In the setting of pregnancy GVH is uncommon. In a meta-analysis of pregnant patients only five ventral hernias were described among nearly 33,000 patients [1]. Similarly, pregnancy in the setting of TAC is exceptionally rare. Our review of the literature did not identify other cases of TAC followed by a pregnancy. The literature does contain one case in which a pregnant woman suffered abdominal trauma and was managed with TAC [2]. In this report, we present the case of a woman who sustained penetrating abdominal trauma, received treatment with TAC, failed to return to clinic, then subsequently re-presented with a second trimester gestation.

Case Report

A 20 year old female presented with a trans-abdominal gunshot wound involving the duodenum, liver, and colon. The patient subsequently underwent small bowel resection, gastrojejunostomy, colon resection, and partial hepatectomy. Due to the patient's severity of illness the wound was managed with a TAC. Ultimately, her care required multiple laparotomies and a lengthy hospitalization. The patient was discharged with TAC. After discharge, the patient failed to return to clinic and became un-reachable. Seventeen months after initial injury, the patient returned with an ultrasound-confirmed 26 week intrauterine pregnancy. Her care was coordinated between the trauma surgery service, obstetrics, and maternal fetal medicine.

At 37 weeks, a multi-disciplinary team led by the trauma surgery service, delivered a healthy five pound 10.2 ounce male via Cesarean Section (C-section). Prior to delivery a decision had been made to do a staged operation to facilitate closure with a smaller uterus, therefore, after the C-section, an Abthera ®(KCI, San Antonio, TX) was used to give the patient another TAC. Four days after delivery, the patient was taken back to the operating room for AWR (abdominal wall reconstruction). Using a sandwich technique, a tension-free closure of the fascia was performed using a Strattice Biological Tissue Matrix® underlay, closure of the fascia, and a Strattice Biological Tissue Matrix® onlay. Finally, the redundant skin was excised prior to skin closure. The patient was discharged to follow-up and both the patient and her child continue to do well in follow-up. (See Figure)



On left side of figure is pre-op picture; on the right side of the figure is a post-op picture

Discussion

Existing medical literature supports "watchful waiting" and conservative care for pregnant women with GVH. Serra et al reported that bowel rest, intravenous fluids, and nasogastric tube placement were sufficient to manage a symptomatic GVH in a patient presenting at 28 weeks gestation. Similarly, Rao et al noted that, in a woman with a large uterine herniation through the scar of a previous laparotomy, conservative management was sufficient to successfully deliver the fetus near term [3,4].

This case reinforces the concept of "watchful waiting" with successful delivery after observational intra-partum care. The decision to perform the AWR (abdominal wall reconstruction) four days post-partum was influenced by two variables: post-partum physiology and LOD.

Physiologically, the process of uterine involution post-delivery is well documented in the literature [5]. Importantly, the post-gravid uterus undergoes marked involution in the first four days following delivery [5]. Post-gravid uterus length can be expected to involute approximately 1 cm a day in the first four days following delivery [6]. If one analyzes this as if the uterus were a sphere, this corresponds to a 52.6% reduction decrease in uterine volume. Consequently, allowing four days for the uterus to involute decreases the volume of intra-abdominal contents, potentially decreasing the risk of abdominal compartment syndrome. Post-gravid involution, then, would be expected to facilitate successful AWR.

LOD refers to the displacement of intraabdominal contents to a space outside the body cavity; retraction of the muscles in an open abdomen contribute to LOD. In the setting of GVH, LOD complicates potential abdominal closure. The major initial risks associated with AWR are intraabdominal hypertension and abdominal compartment syndrome [7]. As the primary complication of GVH repair is related to intraabdominal pressure, increased elasticity of the abdominal wall is a protective factor [8]. Pregnancy is a state in which abdominal collagen elasticity increases and potentially constricting fascial planes are stretched and loosened [6].This effect is caused by collagen de-polymerization by a mixture of placental hormones, particularly relaxin [9].

Relaxin is a hormone present in the intra-partum period that contributes to tissue laxity. In has been shown in animal models that it remains present in the immediate post-partum period with significant effects on the gravid tissue continuing during the first four days post-partum [9]. The effect of relaxin and related placental hormones will wane significantly after that time. This increased elasticity in the immediate post-partum days following delivery would theoretically make early closure of GVH more advantageous.

Conclusion

This case describes successful delivery after "watchful waiting" in a pregnant patient with GVH. In this case, the timing of definitive AWR was determined by balancing key physiological factors. Allowing time for uterine involution post-partum decreases the volume of intra-abdominal contents, thus improving the likelihood of successful abdominal closure. Simultaneously, as time passes, LOD and decreased post-partum laxity complicate successful closure. Selecting a physiologically appropriate time to complete AWR has the potential to decrease morbidity, hospitalization, and closure failure while simultaneously improving the well-being of the patient. We propose that AWR four days post-partum allows time for significant uterine involution with minimal loss of collagen elasticity therefore this may be the ideal physiological time to proceed with correction of a GVH in the post-partum period.

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