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Hypertriglyceridemic Pancreatitis Causing Preterm Labor and Subsequent Abdominal Compartment Syndrome

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Background	Acute pancreatitis, most commonly arising secondary to gallstones or chronic alcoholism, can rarely arise in the setting of hypertriglyceridemia. Normal physiological changes of pregnancy include up to a two- to three-fold increase in triglyceride levels, which can have severe outcomes in those with underlying undiagnosed or familial hypertriglyceridemia. Among the most severe consequences of the development of hypertriglyceridemia is the potential downstream outcome of acute pancreatitis, which can have severe sequelae, including abdominal compartment syndrome, pancreatic necrosis, and severe acidosis.
Summary	We present a patient who developed abdominal compartment syndrome secondary to hypertriglyceridemic pancreatitis exacerbated by pregnancy, requiring immediate cesarean section. Both the child and the mother survived following extensive interdisciplinary and intensive care.
Conclusion	This case demonstrates the importance of interdisciplinary collaboration for the care of the critically ill postpartum patient. The rapid identification and diagnosis of severe pancreatitis as well as abdominal compartment syndrome were accomplished through input from multiple specialties. Although this is a rare disorder, a lipid panel when approaching the third trimester may be performed to ensure fetal safety.
Key Words	hypertriglyceridemic pancreatitis; compartment syndrome; pregnancy

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Case Description

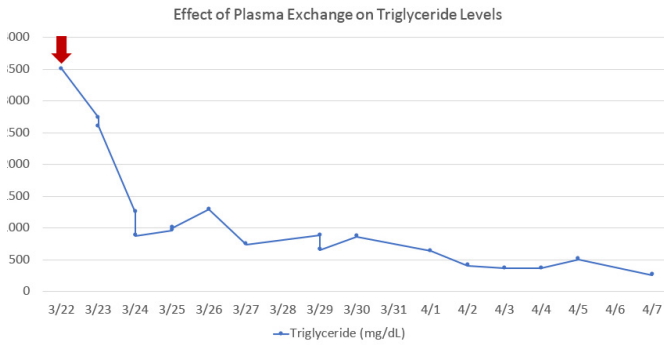
A 34-year-old White female who was G2P1001 and otherwise healthy presented to the emergency department following an episode of abdominal pain at 24 weeks gestation. Workup revealed that lipase was normal at 35 U/L, and the patient exhibited mild leukocytosis (11.7) and hyponatremia (125 mmol/L). Liver enzymes were unremarkable. Her symptoms improved with a GI cocktail. She was discharged home with close OB follow-up. Her family history was positive for cancer, hypertension, diabetes mellitus, and coronary artery disease. No detailed history of lipid disorders had been obtained at that point.

Prenatal visits were regular and unremarkable until her presentation to the obstetrics unit at week 32 with severe abdominal pain and nausea. Her white blood cell count was elevated to 17.2, she appeared toxic, and her nonstress test demonstrated prolonged fetal decelerations. As a result, she underwent an emergent cesarean section at 32W4D. Chylous ascites were noted upon entry to the peritoneal cavity. An intraoperative general surgery consultation was obtained to evaluate the chylous ascites found during the cesarian.

After delivery of the fetus, the abdomen was explored via a midline incision by general surgery. The pancreas was noted to be edematous without pseudocyst or mass; no abscess or bowel injury was identified, and therefore the abdomen was closed. Postoperative laboratory studies revealed a lipase of 888 U/L, triglycerides of 3504 mg/dL, and cholesterol of 1561 mg/dL. Consultations with nephrology and endocrinology were obtained to begin emergent plasma exchange and assist with managing this patient's hypertriglyceridemia, respectively. Gemfibrozil and omega-3-acid ethyl esters were recommended to treat the hypertriglyceridemia. An insulin drip and D5W were also initiated by endocrinology to act as adjuvant therapy in lowering triglyceride levels and maintaining blood glucose levels, respectively. Total parenteral nutrition was instituted to allow for pancreatic rest while maintaining adequate nutritional status.

The patient progressively worsened clinically since delivery of the fetus, developing progressive abdominal distention and requiring continual fluid support. However, she remained hemodynamically stable and didn't require vasopressors. On postoperative day (POD) 1, she was noted to have clinical signs of abdominal compartment syndrome and returned to the OR for decompressive laparotomy and temporary abdominal closure. She was profoundly hypocalcemic with carpopedal spasms. An infusion of calcium was initiated with a frequent reassessment of the calcium level. Plasma exchange was initiated with a subsequent improvement in her serum triglyceride level (Figure 1). In the interim, her abdomen remained open and was managed with a Wittman patch and negative-pressure wound therapy. She underwent aggressive diuresis with subsequent improvement in bowel edema and anasarca. She was extubated on POD 3 and underwent delayed primary fascial closure on POD 4.

Figure 1. Effect of Plasma Exchange on Serum Triglyceride Levels. Published with Permission



Red arrow signifies start of plasma exchange therapy

With ongoing medical therapy managed by endocrinology, the patient's triglyceride level improved to 1294 mg/dL, and her hypocalcemia resolved. Over the subsequent week, plasma exchange was continued via a tunneled hemodialysis catheter until the normalization of her hypertriglyceridemia. She transitioned from parenteral to enteral nutrition and finally to a low-fat solid diet. An early pseudocyst was noted on imaging prior to home discharge, with plans to monitor via axial imaging.

The patient was readmitted five weeks later with sepsis and hypovolemic shock. An infected pseudocyst was drained percutaneously, and her sepsis resolved with antibiotics and fluid resuscitation. All drains were eventually removed with complete resolution of all pseudocysts and peritoneal fluid collections at follow-up imaging. Extensive lipid and genetic sampling yielded evidence of a familial hyperlipidemia pattern. Dietary changes and a combination of oral lipid-lowering agents have achieved normalization of triglyceride (125 mg/dL) and lipid levels. She has experienced no further bouts of pancreatitis. She underwent a successful ventral hernia repair with component separation 18 months after her initial surgery.

Discussion

Hypertriglyceridemic pancreatitis during pregnancy is a rare event, and it is even more unique to preterm labor and abdominal compartment syndrome. Estimates of acute pancreatitis incidence in pregnancy suggest an occurrence of approximately 3 in 10,000 pregnancies.[1] While rare, it has been shown that pancreatitis secondary to hyperlipidemia causes significantly more significant fetal distress than other etiologies.[2] A retrospective review of severe acute pancreatitis at one institution reported 18 cases of acute pancreatitis during pregnancy. Of those cases, seven had induction of preterm labor due to the ailment, and only one fetus survived.[3] The child of the woman presented in this case survived and had no notable postpartum conditions to report. Additional cohort studies seem to indicate that maternal death is extremely rare,[4] with one review suggesting it is essentially a never-event.[5]

Hypertriglyceridemia is classified into moderate and severe based on fasting triglyceride levels. Moderate is defined as anywhere from 150mg/dL to 1000mg/dL, and severe is defined as a triglyceride value that surpasses 1000mg/dL. Most cases of hypertriglyceridemia can be managed in an outpatient setting with lifestyle modifications, oral fibrates, and omega-3 fatty acids, but severe cases which lead to pancreatitis require significant care. This care revolves around lowering triglyceride levels below 1000mg/dL; additional strategies include implementing an insulin drip with dextrose. In severe acute pancreatitis, initiating plasma exchange is indicated.

Prevention of hypertriglyceridemic pancreatitis in pregnancy requires early identification of hyperlipidemia followed by interdisciplinary collaboration to manage the patient's lipid status aggressively. As others have suggested,[6-8] we recommend monitoring lipid profiles before pregnancy, throughout pregnancy, and especially when approaching the third trimester. This monitoring should be considered mandatory in an individual with a family history of lipid disorders. When identified early, prevention measures include lifestyle modifications (e.g., low-fat diet) and pharmacotherapy if needed (e.g., niacin, fibrates, omega-3 supplementation, and MCT oil).[9] No guidelines by the American College of Obstetricians and Gynecologists currently recommend regular monitoring of triglyceride levels throughout gestation. Reports have discussed the success of plasma exchange, which we employed with this patient.[10-12] We echo the success of this technique in complicated patients such as this one.

Conclusion

This case demonstrates the importance of interdisciplinary collaboration for the care of the critically ill postpartum patient. The rapid identification and diagnosis of severe pancreatitis as well as abdominal compartment syndrome was accomplished through input from multiple specialties. Although this is a rare disorder, a lipid panel when approaching the third trimester may be performed to ensure fetal safety.

Lessons Learned

Hypertriglyceridemia can present late in pregnancy from physiological changes, leading to possible dangerous sequelae, including pancreatitis. Severe pancreatitis can lead to abdominal compartment syndrome, necessitating emergent cesarean section. A multimodal and interdisciplinary approach to these complex patients can have favorable outcomes.

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