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Successful pregnancy after Whipple's procedure for pancreatic neoplasm

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Abstract:

Pregnancy after undergoing major gastrointestinal surgeries like the Whipple's procedure (pancreaticoduodenectomy) for pancreatic neoplasm is rare. This case report describes a 24-year-old woman who conceived and delivered a healthy baby after undergoing a Whipple's procedure 5 months earlier for a pancreatic tumor. Her pregnancy was managed by a multidisciplinary team, and she delivered at 37 weeks of gestation through cesarean section without any complications. This case highlights the potential for successful pregnancy following a Whipple's procedure, with proper counseling, coordinated care, and close monitoring during pregnancy.

Keywords:

Gastrointestinal surgery, multidisciplinary care, pancreatic neoplasm, pancreaticoduodenectomy, postsurgical pregnancy, pregnancy, Whipple's procedure

Introduction

Pregnancy following a Whipple's procedure (pancreaticoduodenectomy) is uncommon, and there is limited information on the outcomes and management of these cases. The Whipple's procedure, primarily performed for cancers of the pancreatic head, entails the removal of the head of the pancreas, parts of the duodenum, gallbladder, and sometimes a portion of the stomach, followed by reconstruction of the digestive system. Due to the significant anatomical and functional changes, pregnancy introduces distinct challenges, particularly regarding nutritional status, glycemic control, and the well-being of both mother and fetus. This case report details a successful pregnancy in a patient with a history of Whipple's procedure, emphasizing clinical management and outcomes.

Case Report

A 24-year-old female, gravida 2 para 1 with one living child, presented to the

obstetric clinic at 8 weeks and 3 days of gestation. She had undergone a Whipple's procedure 5 months prior for an early-stage solid pseudopapillary epithelial neoplasm of the pancreas. As it was early stage and completely resectable, no adjuvant therapy was advised. Her recovery was uneventful, and she was instructed to follow a pancreatic diet which includes small frequent meals around 5–6 times per day with low-fat content, avoiding deep-fried foods. She received nutritional supplementation in the form of multivitamin tablets postsurgery, along with close nutritional monitoring. The patient was kept under close follow-up with a surgical gastroenterologist. She had regular menstrual cycles thereafter, indicating preserved fertility despite the procedure. At the time of conception, her body mass index was 23, and her prepregnancy weight had been stable. Due to her history of Whipple's surgery, the pregnancy was considered high risk and was managed by a multidisciplinary team, which included an obstetrician, a gastroenterologist, and a dietitian. The main concern during pregnancy was the patient's nutritional status, given her

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previous surgery, which could affect both fetal growth and maternal well-being. Regular evaluations of her nutritional intake were performed, and she was advised to increase her caloric and protein consumption to meet the heightened demands of pregnancy. Despite having no pregestational diabetes, the patient's pancreatic function was closely monitored due to the risk of impaired glucose tolerance after partial pancreatic resection. An oral glucose tolerance test (OGTT) conducted at 24 weeks indicated gestational diabetes mellitus. She received guidance on dietary modifications and was advised to follow a low-sugar and low-fat diet, helping keep her condition under control. While she did not require insulin therapy, she continued regular monitoring of her fasting and postprandial blood sugar levels while on a diabetic diet. Serial obstetric ultrasounds for fetal biometry, amniotic fluid volume, and Doppler studies were done at 28, 32, and 37 weeks of gestation. These parameters remained within normal limits. Doppler studies indicated no signs of uteroplacental insufficiency. The patient had a total weight gain of 9 kg during her entire pregnancy. She had been given both the options of trial of labor after cesarean and a repeat cesarean section after adequate explanation on the pros and cons of both modes of delivery. The patient opted for abdominal delivery. She was admitted for an elective cesarean section at 38 weeks and 5 days of gestation. Intraoperatively, there were no adhesions. The lower uterine segment was well formed with grade 1 previous cesarean section scar. The patient delivered a healthy male infant weighing 3.3 kg. The Apgar scores were 9 and 9 at 1 and 5 min, respectively. Both mother and infant were discharged after an uneventful postpartum recovery. The patient continued to receive nutritional support with multivitamin supplementation and was advised to continue a pancreatic diet.

Discussion

Pregnancy after a Whipple's procedure is uncommon, and existing literature on the topic is limited mainly to case reports. Fertility can be preserved in these patients, as demonstrated in this case and other reports.^[1,2] Whipple's procedure *per se* will not affect the patient's fertility. However, it may be affected in individuals who underwent this procedure due to underlying disease or those in whom the surgical procedure was prolonged. Furthermore, the patient will be under stress during the surgery and after, which may result in irregular menstrual cycles. Postprocedure diet among these individuals is restricted, and this may lead to malnutrition if adequate nutritional support is not provided. All these factors may lead to infertility after the procedure. Magoga *et al.*^[1] reported a successful pregnancy in a woman who underwent a Whipple's procedure for pseudopapillary neoplasm of the pancreas

with antenatal complications of pregestational diabetes, diabetic ketoacidosis, pancreatitis, etc. Pregnant women after Whipple's procedure are at risk of developing either pregestational or gestational diabetes and associated complications such as diabetic ketoacidosis, pancreatitis, cholangitis, and unexplained severe abdominal pain.^[1,2]

Nutritional deficiencies pose a significant risk due to malabsorption following the procedure. Malabsorption is specifically for fat. Patients may have steatorrhea which can be prevented by pancreatic enzyme supplementation. Both diabetes and steatorrhea impact the nutritional status of the patient.^[1,3]

Pancreatic insufficiency, coupled with the increased nutritional demands of pregnancy, requires careful monitoring of both macronutrient and micronutrient levels. These individuals are at risk of malnutrition, with iron, calcium, zinc, copper, selenium, and Vitamins A, E, D, and K as the most common nutrients of concern.^[4] This can have serious implications for both the mother and fetus. In the case presented, early intervention with nutritional supplementation and vitamin prophylaxis contributed to the positive outcome. Around 20%–50% of patients may develop diabetes following surgery, resulting from decreased insulin production.^[4] Glycemic control is another essential aspect of managing pregnancies after pancreatic surgery. The index patient was closely monitored with OGTT during the first trimester and at 24 weeks of gestation, after which fasting and postprandial glucose tests for diabetes were done once in 2 weeks. While she did not develop pregestational diabetes, she did experience gestational diabetes, which was managed effectively with a diabetic diet – a common complication after Whipple's procedure.^[1,3] Maintaining tight glycemic control is crucial to preventing fetal complications such as macrosomia and preterm delivery. These patients can undergo normal vaginal delivery. As diabetes is the most common complication after a Whipple's procedure, patients who develop pregestational or gestational diabetes will require termination of pregnancy by induction of labor at 38 completed weeks. Literature is very limited regarding pregnancy outcomes. More case reports and research are needed to assess the outcome of pregnancy after Whipple's surgery for pancreatic tumors.

In our case, as the patient had a history of previous cesarean section and with no consent for a trial of labor, a planned abdominal delivery was done. Intraoperatively, minimal adhesions were found, and the surgery was carried out without any significant complications. Postdelivery, patients should be advised

on nutritional supplementation with fat-soluble vitamins and maintaining a pancreatic diet containing low fat (<30%) and high protein. Simple sugars should be avoided in foods and drinks. Sugar alcohol should likewise be avoided. Fluids should be limited to 120–130 mL at a meal, but other fluids should be taken 30–40 min after eating. They should be instructed to take multiple small frequent meals (5–6 meals/day), eat slowly, and chew foods thoroughly.^[4] In addition, surveillance for pancreatic malignancy should be done through regular visits with a surgical gastroenterologist.

Conclusion

This case demonstrates that a successful pregnancy is achievable after a Whipple's procedure but requires comprehensive multidisciplinary care. Preconceptional counseling should be offered among women with a history of Whipple's procedure to prevent diabetes and its associated complications. Nutritional supplementation should be started in the postoperative period and continued during pregnancy to prevent maternal and neonatal complications from malnutrition. Close monitoring of nutritional status, glycemic control, and fetal growth is crucial for ensuring positive outcomes for both mother and fetus. This case contributes to the limited literature on the subject, emphasizing the need for further research and the creation of standardized management guidelines for such pregnancies.

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We especially thank our patient for her consent for publication.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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