

Solid Pseudopapillary Neoplasm of Pancreas Mimicking a Pseudocyst in Pregnancy: Diagnosis by Fine Needle Aspiration Cytology

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Abstract

Solid pseudo papillary neoplasm (SPN) of pancreas is a low grade malignant epithelial tumour which in most cases affects (>90%) young females. Its occurrence during pregnancy is exceptionally uncommon and presents significant diagnostic and therapeutic challenges. We herein present the case report of a solid-pseudo papillary neoplasm of pancreas in a 29 year old, G3P2L2 pregnant female whose antenatal anomaly scan during the 2nd trimester had revealed a large, thickened cystic lesion 9.5x7.8 cm in the right hypochondrium near the pancreatic head. Intraoperative FNAC and ascitic fluid cytology were performed. Cytological aspiration shows branching, pseudopapillary clusters lined by uniform, monomorphic cells with delicate vacuolated cytoplasm, round to oval nuclei that occasionally show nuclear grooves. Patient had an uneventful postoperative recovery and definitive surgical intervention scheduled for a later date

Keywords: Solid pseudopapillary Neoplasm, Pancreas, Pregnancy, Pseudocyst; Cytology

Introduction

About 1 to 2% of all exocrine pancreatic neoplasms are Solid pseudopapillary neoplasms (SPNs) with strong predilection to girls and young women usually in their 2nd or 3rd decade of life [1]. SPNs can occasionally display aggressive behavior, local invasion or distant metastasis (10-15% of cases). It has excellent prognosis with >80% cured with surgical resection [2]. The diagnosis of a pancreatic mass during pregnancy is highly unusual. Handling such a case requires balance between the health of the fetus, safety of the mother and oncological sequelae [3].

SPNs express progesterone receptors, so it has been hypothesized that the hormonal milieu of pregnancy, notably higher progesterone and estrogen levels, increase the risk of accelerated growth, often rupture, spontaneous abortions and premature delivery [4]. In order to differentiate SPNs from other cystic and solid lesions, such as mucinous cystic neoplasms, serous cystadenomas, and pancreatic neuroendocrine tumors (PanNETs), fine needle aspiration cytology (FNAC) which is frequently carried out intra-operatively or under endoscopic ultrasound (EUS) guidance is essential [5]. The clinical, radiological and intraoperative FNAC results of a pancreatic SPN that was incidentally found and diagnosed during pregnancy are described in this case report

Case Report

Clinical history and Antenatal Course

A 29 year old female (G3P2L2) with a known history of gestational diabetes managed on diet, and history of two previous LSCS was admitted to the hospital at 38 weeks of gestation for safe confinement. Married for 10 years, last childbirth 2.5 years back. Conception was spontaneous. The first trimester course was notable solely for hyperemesis gravidarum, there was no history of vaginal bleeding, spotting PV, urinary tract infections, fever with rash, radiation exposure. Early antenatal screening, including a nuchal translucency (NT) scan and double marker biochemistry revealed a low risk pregnancy.

During her second trimester, an anomaly scan incidentally detected a large thickened cystic areas with internal echoes measuring 9.5x7.8 cm, located in the maternal right hypochondrium near the head of pancreas. MRI (Figure 1) performed on January 13, 2026 showed a large well defined, multi septated T2W/T2W FS hyperintense complex cystic intraperitoneal lesion in the right hypochondrium extending superiorly to periportal region, measuring 8x9x8.5 cm (AP x TR x CC). The lesion shows multiple T2W/STIR heterogeneous contents within.

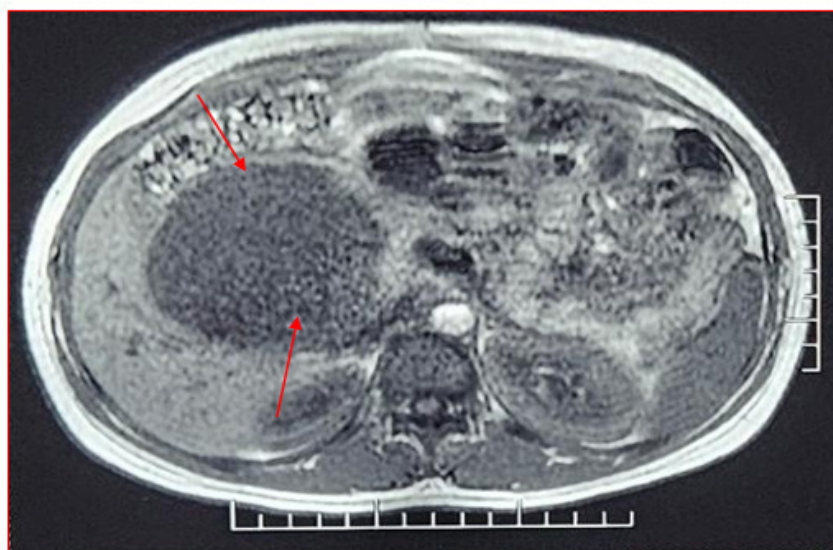


Figure 1. Axial contrast-enhanced upper abdominal MRI scan demonstrating a large, well-encapsulated, multiseptated tumour in the right hypochondrium (marked with red arrows), extending superiorly to periportal region.

Possibilities described were

1. Pancreatic pseudocyst
2. Oligocystic serous cystadenoma

Throughout the third trimester, the patient remained asymptomatic, perceiving good fetal movements without any signs of leaking or bleeding per vaginum. A general surgery consultation was obtained and intra operative surgical assistance was planned for the delivery

Laboratory Investigations

Investigations	Values	Reference range
Serum Amylase	78.4	30-110
Serum Lipase	28.6	0-160
Bilirubin(Total & Direct)	0.66 & 0.28	Total:0.3-1mg/dl
SGOT & SGPT	28.1& 6.26 IU/L	Upto 40U/L
Alkaline Phosphatase	105 IU/L	39-117 U/L
Total Protein	4.6 g/dl	6.4-8.3 g/dl
Albumin	2.77 g/dl	3.8-4.4g/dl
Globulin	1.8g/dl	2.2-3.9g/dl
CBC		
Hb	10.1 g/dl	12-15 g/dl
WBC	18270 cells/mm ³	4000-15,000 cells/mm ³
DC	N:89% L:6% E:1% B:1% M:3%	N(40-80%)L(20-40%)M(2-10%)E(1-6%)B(<1-2%)
Platelets	1,91,000/mm ³	1,50,000-4,50,000/mm ³
RBC count	4.26 million/mm ³	3.5-5.5 million/mm ³
PCV	31.80%	36-46%
MCV	74.60%	80-100
MCH	23.8pg/ml	25.4-34.6 pg
MCHC	31.8	31-36
Blood urea & Creatinine	13.8mg/dl & 0.52 mg/dl	50 mg/dl & 0.7-1.3 mg/dl

Antenatal laboratory workup demonstrated normal pancreatic and liver enzymes and standard physiological changes of pregnancy

Intraoperative Findings and Cytological Sampling

An elective cesarean section was performed by vertical incision put extending from the infra umbilicus to suprapubic area. A healthy female baby was delivered weighing 2.935 kg at 10:31 am on 31/3/2026. Bilateral tubal sterilization done by modified pomey's method. Surgical exploration of the abdomen revealed a 8x8 cm lesion with variable consistency extending from the head of pancreas adherent to duodenum. Intraoperative FNAC of the pancreatic lesion was performed along with ascitic fluid sampling for cytological evaluation. Patient tolerated the procedure well, recovered without acute complications, on discharge patient resting and afebrile, vitally stable and hence discharged on postoperative day 4.

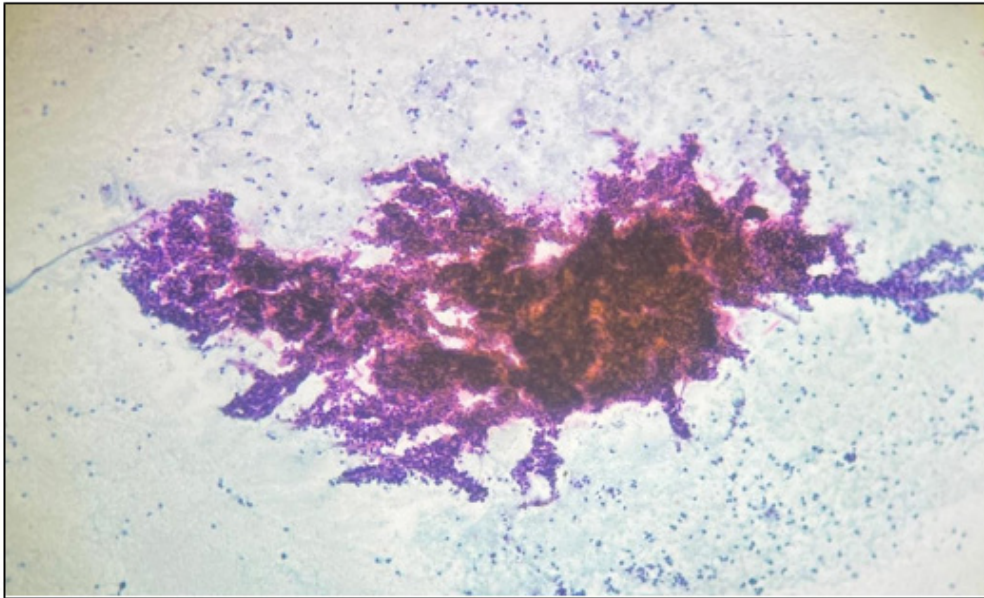


Figure 2. Pancreatic FNA cytology displaying a dense, highly cellular smear highlighting the branching clusters of monomorphic tumor cells with pseudopapillary formation typical of solid pseudopapillary neoplasm (SPN) [PAP×100]

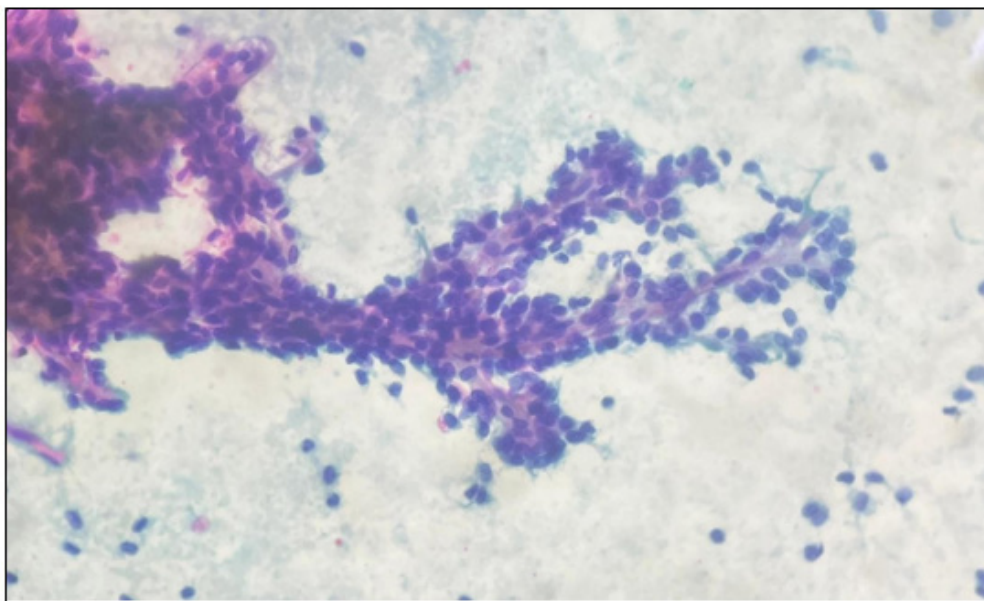


Figure 3. Pancreatic FNA smear demonstrating a classic, well-defined branching pseudopapillary structure with the monomorphic neoplastic cells arranged around delicate, slender fibrovascular cores [PAP×400].

Cytological Findings

Cytological Feature	Description observed in smears
Architecture	Cellular smears with cells arranged in loosely cohesive groups and tissue fragments with papillary pattern (<i>Figure 2,3</i>)
Cellular Morphology	Relatively Bland and uniform cells
Cytoplasm	Moderate amount of delicate cytoplasm with dispersed tumour cells in the background showing slender cytoplasmic processes. Intracytoplasmic hyaline globules can be seen
Nuclear features	Round to oval uniform bland nuclei with smooth contour, occasional nuclear grooves, finely dispersed chromatin and indistinct to small nucleoli

Discussion

Solid pseudopapillary neoplasm of the pancreas, previously known as papillary and solid epithelial neoplasm, papillary-cystic neoplasm, cystic solid papillary carcinoma also known as Frantz's tumour commonly seen in young females in the 20s and 30s [6]. A significantly minority cases have been detected incidentally. It is a rare clinical scenario in pregnancy and it has been hypothesised that the physiological hormonal surge particularly that of progesterone stimulate tumor growth as they express progesterone receptors [4]. An asymptomatic lesion thus had rapidly increased in size and become radiologically prominent and reached a size of 8x9x8.5cm in 2nd trimester. Radiologically, In Ultrasound solid pseudopapillary neoplasm of the pancreas present as a large well defined mass with heterogeneous appearance due to its Solid and cystic composition. In CT, well-defined mass with central cystic and peripheral solid components. Enhancement was heterogeneous due to hemorrhagic degeneration and necrosis In MRI, T2 -Heterogenous to high signal density lesion [7]. In our case MRI favoured pseudocyst or an oligocystic serous cystadenoma due to the multiseptated appearance in the right hypochondrium while the serum levels of amylase and lipase were normal, we could rule out acute inflammation of pancreatic pseudocyst but a chronic or non-inflammatory pseudocyst remained a differential diagnosis

FNAC serves as a vital tool for establishing the diagnosis

Cytological hallmarks of Solid pseudopapillary neoplasm of the pancreas are highly characteristic and distinguish it from other entities:

Pseudopapillae: The diagnostic hallmark is numerous papillary fronds composed of fibrovascular stalks with tumour cells arranged around capillaries surrounded by hyalinised rim. Nuclei oriented away from capillaries, cytoplasmic zone oriented towards the capillaries

Monomorphic cells: Cuboidal cells with moderate to abundant cytoplasm, which may contain eosinophilic inclusions which are PAS-D(+), round to oval monomorphic nuclei with 1 or 2 inconspicuous nucleoli. Occasional nuclear folds can be seen. No atypia/ mitosis

Ancillary tests can aid in the diagnosis, the Solid pseudopapillary neoplasm of pancreas would be PAS-D(+) hyaline globules, -positive for Beta catenin, Alpha 1 antitrypsin, CD 10, Vimentin, PR, CD 56, CD 99(para nuclear dot like pattern) and the top differential diagnosis include Neuroendocrine tumors and Acinar cell carcinoma

The approach of management of SPN depends on the tumour size and location. The procedures include Enucleation (EN), Spleen preserving distal pancreatectomy (DPS), Distal pancreatectomy (DP) and Pancreaticoduodenectomy. In our case the tumour is located in the head of pancreas so Pancreaticoduodenectomy is the preferred method.[8] Since the tumour was adherent to duodenum a staged approach was adopted, a definitive oncological resection planned electively post puerperium, given the low grade and typically slow growing nature of SPNs

List of abbreviations

- SPN: Solid Pseudopapillary Neoplasm
- FNAC: Fine Needle Aspiration Cytology
- MRI: Magnetic Resonance Imaging; GDM
- Gestational Diabetes Mellitus
- EUS: Endoscopic Ultrasound
- PanNETs: Pancreatic Neuroendocrine Tumors
- NT: Nuchal Translucency

Conclusion

This case emphasizes the significance of Solid pseudopapillary neoplasm of the pancreas in the differential diagnosis of any complex cystic pancreatic lesion found in young pregnant women. Based on the hallmark features, architecture and cellular monomorphism intra operative FNAC offers quick highly accurate and conclusive cytological analysis. Early detection enables meticulous multidisciplinary approach among pathologists, radiologists, surgical oncologists and obstetricians and there by ensuring best possible outcomes to mother and fetus while scheduling post-operative definitive surgical intervention. Intraoperative FNAC serves as a vital, rapid and minimally invasive diagnostic tool for evaluating intra-abdominal pancreatic mass discovered during pregnancy to guide early initiation of surgical and oncological treatment

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