Sister Mary Joseph’s nodule (SMJN): An alarming sign of pancreatic cancer for a radiologist
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Section: Abdominal imaging
Area of Interest: Abdomen Biliary Tract / Gallbladder Pancreas Peritoneum Special Focus: Cancer Endocrine disorders Metastases Neoplasia Case Type: Clinical Cases
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Patient: 70 years, female

Clinical History:
A 70-year-old female patient, from a rural area presented to local paramedics with generalised weakness and a blackish painful umbilical nodule. Her blood pressure was 130/80 mmHg and random blood sugar was 12.5 mmol/l. US of abdomen revealed “anterior abdominal wall sinus/abscess”. So dressing and antibiotics were advised. After 4 months, she visited our hospital, where an inflamed umbilical nodule, 2x3 cm with no ulcer was found (Figure 1).

Imaging Findings:
US of whole abdomen and pelvis was done in our hospital which revealed a mixed echogenic area in the region of body and tail region of pancreas (Figure 2). Space occupying lesion in left adrenal region (Figure 3). With high frequency 8–12?MHz linear array transducer a small umbilical based nodule is demonstrated (Figure 4). CECT of abdomen and pelvis revealed:
1. Ill-defined hypodense area approximately measuring about 2.4 x 2.3 cm at body and tail of pancreas (Figure 6 & 7).
2. Almost rounded heterogeneously enhancing soft-tissue density mass lesion approximately measuring about 2.6 x 2 cm in adjacent left adrenal gland (Figure 6).
3. Mildly enhancing soft tissue density (+50 HU) mass lesion approximately measuring about 1.4 x 1.7 cm is noted in umbilical region, which was free from anterior abdominal muscles and underlying bowels.
4. Multiple peritoneal deposits, largest one at right peritoneal region. Metastasis (Figure 8 & 9).
FNAC from umbilical nodule was done and sent for pathological examination, which revealed a metastatic adenocarcinoma (Figure 5).

Discussion:
GLOBOCAN 2012 estimates 55.5% of pancreatic cancers were registered in developed countries [1]. However
Pancreatic cancer is the 5th leading cause of death in Asian countries [3]. 90% of pancreatic cancers are diagnosed at the metastatic stage, so survival is poor [2].

Route through which pancreatic cancer reaches umbilicus as a metastasis, is thought to be from the direct invasion from peritoneum or through lymphatic or blood vessels. SMJN in a patient with pancreatic cancer signifies poor prognosis; the mean survival is 6-11 months according to Xue-Li Bai et al [4].

Majority of umbilical metastasis originates from intra-abdominal or pelvic structures usually GIT, but only 6% of SMJN are pancreatic in origin. Histologically, adenocarcinoma is the cause for this nodule in 75% cases [5].

CECT of abdomen and pelvis with histopathological correlation is the mainstay in diagnosis of SMJN which helps to find a primary cause for umbilical neoplasm [6].

Presence of SMJN is a bad sign for surgery as it is a stage where surgery cannot be done [6]. Occasionally umbilical nodules are benign like foreign body granuloma, keloid, myxoma, and sometimes of primary origin from umbilicus itself e.g. melanoma [7]. According to Marek Wroński et al, relation of umbilicus with various embryologic remnants along with its numerous vascular and lymphatic supply facilitates the migration of tumor cells to the umbilicus. However, exact pathogenesis behind umbilical metastases is still unknown [8].

Imaging Perspective
- Careful scrutiny of peri-umbilical area is needed to differentiate metastatic nodule from ventral hernia.
- Lesions in this region are superficial, so think about histopathological correlation.
- When nodule in umbilical region shows mild enhancement, it is overlooked by many radiologists, because of its rarity [8].
- US - Solid hypo echoic area in umbilicus without signs of inflammation may suggest metastatic umbilical nodule (SMJN), here, primary tumour should be discovered [8].
- When we find peritoneal deposit (as in our case) with ascites, it suggests a malignant infiltration where SMJN represents a tip of an iceberg [8].

Take Home Message:
Pancreatic cancer rarely presents as cutaneous metastases. However, this possibility should be considered when malignant skin lesion is of unknown origin.
- SMJN is a common word representing the metastatic umbilical nodule.
- Metastasis to umbilicus originates from intra-abdominal or pelvic organs.
- Pancreas is the source of SMJN in 7–9% cases.
- FNAC from umbilical nodule clinches diagnosis.
- CECT is ideal for the primary site.

Written informed patient consent for publication has been obtained.

**Differential Diagnosis List:** Carcinoma of pancreas - Metastasis to the left adrenal gland & peritoneum with metastatic umbilical nodule (SMJN), Secondary deposit to the umbilicus (Sister Mary Joseph’s nodule), Para umbilical hernia, Surgical scar, Granuloma, Omphalith

**Final Diagnosis:** Carcinoma of pancreas - Metastasis to the left adrenal gland & peritoneum with metastatic umbilical nodule (SMJN)

**References:**
Vimala Yendluri, MD,* Barbara Centeno, MD,P and Gregory M. Springett, MD, PhD (Pancreas 2007;34:161Y164
Pancreatic Cancer Presenting as a Sister Mary Joseph’s Nodule Case Report and Update of the Literature (PMID: 17198200)
Xue-Li Bai, Qi Zhang, Waqas Masood, Noman Masood, Yin Tang, Chun-Hui Cao, Qi-Han Fu, Yun Zhang, Shun-Liang Gao, and Ting-Bo Liang 2012 Dec 7; 18(45): 6686–6689. Sister Mary Joseph's nodule as a first sign of pancreatic cancer World J Gastroenterol. (PMID: 23236247)
Figure 1

Description: Clinical photograph showing the dark pigmented umbilical nodule. Origin: Department of Radiology & Imaging Bangabandhu Sheikh Mujib Medical University, Shahbagh, Bangladesh 2019.
Description: USG abdomen showing mixed echogenic mass in the tail region of pancreas. Origin: Department of Radiology & Imaging 'Bangabandhu Sheikh Mujib Medical University, Shahbagh, Bangladesh 2019.
**Description:** USG abdomen showing hypoechoic mass in the region of left adrenal gland. **Origin:** Department of Radiology & Imaging ‘Bangabandhu Sheikh Mujib Medical University, Shahbagh, Bangladesh 2019.
Description: Solid hypoechoic lesion, deep to the umbilicus. This corresponds to the nodule in Figure 1.
Origin: Department of Radiology & Imaging 'Bangabandhu Sheikh Mujib Medical University, Shahbagh, Bangladesh 2019.
Figure 5

**Description:** Histopathology report: Microscopic examination section shows skin. The dermis revealed a metastatic adenocarcinoma. **Origin:** Department of Radiology & Imaging ‘Bangabandhu Sheikh Mujib Medical University, Shahbagh, Bangladesh 2019.
Description: Abdominal contrast-enhanced multi-detector computed tomography scan axial image showing, an ill-defined heterogeneously enhancing mass in the body and tail region of the pancreas, measuring about 2.4 x 2.3 cm, with metastatic SOL in the adjacent left adrenal gland. Origin: Department of Radiology & Imaging 'Bangabandhu Sheikh Mujib Medical University, Shahbagh, Bangladesh 2019.
Description: Contrast-enhanced multi-detector computed tomography reformatted coronal image showing, heterogeneously-enhancing mass in the tail region of pancreas. Origin: Department of Radiology & Imaging ‘Bangabandhu Sheikh Mujib Medical University, Shahbagh, Bangladesh 2019.
Figure 8a

Description: Abdominal contrast-enhanced multi-detector computed tomography scan axial image showing multiple peritoneal deposits. The largest one at right peritoneal region, metastasis.

Origin: Department of Radiology & Imaging, Bangabandhu Sheikh Mujib Medical University, Shahbagh, Bangladesh 2019.
Description: Abdominal contrast-enhanced multi-detector computed tomography reformatted coronal image, showing right peritoneal deposit, metastasis. Origin: Department of Radiology & Imaging ‘Bangabandhu Sheikh Mujib Medical University, Shahbagh, Bangladesh 2019.