The Sister Mary Joseph nodule

The Sister Mary Joseph nodule or Sister Mary Joseph sign is an eponymous term which describes a palpable umbilical nodule occurring as a result of metastasis of an intra-abdominal or pelvic malignancy. Although rare, it is important for trainees to be aware of this key clinical sign, its presentation and significance.

Background and history

Sister Mary Joseph, originally named Julia Dempsey, was born in Salamanca, New York in 1856. She taught in various schools before moving to Rochester, Minnesota in 1889, to help staff the new St. Mary's Hospital that she helped build following a disastrous tornado. Medical staff within the hospital included William W Mayo and his two sons, Charles H Mayo and William J Mayo. Sister Mary Joseph studied nursing and became William Mayo's first surgical assistant. Over time, she became increasingly responsible for the success of the, now world famous, Mayo Clinic established in 1889 by the Mayo brothers (Hill and O'Leary, 1996).

Sister Mary Joseph was involved in preparing patients for surgery. It was during this time that she noticed that a nodule in the umbilicus was often seen in patients with advanced malignancy (Key et al, 1976). She brought this clinical sign to the attention of William J Mayo, who published an article in 1928, referring to the nodule as the 'pants button umbilicus'. The term 'Sister Joseph's nodule' was coined by and used for the first time in 1949 by the English surgeon Hamilton Bailey, in the 11th edition of his well-known textbook *Demonstrations of Physical Signs in Clinical Surgery* (Bailey, 1949).

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Classification of umbilical nodules

Approximately 57% of umbilical tumours are benign (*Table 1*). The differential of the benign umbilical nodule includes dermal naevi, fibroepithelial papillomas, epithelial inclusion cysts, seborrheic keratoses, dermatofibromas and polyps (Khan and Cook, 1997). Congenital malformations of the omphalomesenteric duct, a long narrow tube that joins the yolk sac to the midgut lumen of the developing fetus, can also present as an umbilical nodule. Also included in the differential of the benign umbilical nodule are foreign bodies and talc granulomas – these are usually seen in infants or young children (Steck and Helwig, 1965).

Other important causes include hypertrophic umbilical scars with keloid formation and umbilical herniae. Umbilical endometriosis represents a rare benign cause

Table 1. Benign and malignant lesions of the umbilicus

Benign	Dermal naevi	
	Fibroepithelial papillomas	
	Dermatofibromas	
	Epithelial inclusion cysts	
	Seborrheic keratoses	
	Polyps	
	Congenital malformations of omphalomesenteric duct	
	Talc granuloma	
	Foreign body	
	Hypertrophic umbilical scars (keloid)	
	Umbilical hernias	
	Umbilical endometriosis	
Malignant	Primary (rare ~ 20%)	Melanoma
		Basal cell carcinoma
		Squamous cell carcinoma
		Myosarcoma
		Adenocarcinoma
	Secondary (~80%)	Metastatic adenocarcinoma
		Metastatic sarcoma
		Metastatic mesothelioma
		Metastatic melanoma

> In approximately 50% of cases, the Sister Mary Joseph nodule is associated with gastrointestinal malignancies.

of umbilical nodule, which tends to present as a lone nodule which varies in size in accordance to the menstrual cycle and may cause symptoms such as tenderness and bleeding (Powell et al, 1984).

Approximately 43% of all umbilical nodules are malignant in nature (Shetty, 1990) (*Table 1*). These can be divided into primary and secondary lesions. Primary lesions include melanoma, basal cell carcinoma, squamous cell carcinoma, myosarcoma and adenocarcinoma, but these tend to be rare (approximately 17% of malignant umbilical lesions). The majority (83%) of malignant umbilical lesions are secondary (metastatic) tumours. The most common histological variant of secondary umbilical tumours is adenocarcinoma although there are reports of umbilical metastases originating from sarcoma, mesothelioma and melanoma (Dubreuil et al, 1998).

Associations

In approximately 50% of cases, the Sister Mary Joseph nodule is associated with gastrointestinal malignancies. These include gastric, colonic and pancreatic (mainly body and tail) carcinoma (Yendluri et al, 2007). Approximately 25% of cases are related to gynaecological malignancies, primarily ovarian, but also uterine cancer. Rarely, nodules may originate from the urinary or respiratory tract, or from the appendix (Pseudomyxoma peritonei). In some cases, the primary tumour remains unknown (Galvan, 1998).

The underlying mechanism of metastatic spread to the umbilicus remains largely unknown although likely includes direct transperitoneal spread, spread via lymphatics running alongside the obliterated umbilical vein, haematogenous spread, or spread via remnant structures such as the falciform ligament, median umbilical ligament or remnants of the vitelline duct. Despite poor knowledge of the exact mechanism of spread, it is widely understood that the Sister Mary Joseph nodule is usually associated with multiple peritoneal metastases and therefore is a harbinger of poor prognosis (Cohen, 2008).

Presentation

The Sister Mary Joseph nodule usually presents as a firm, indurate and often vascular swelling (*Figure 1*). It is usually irregular, can be fissured or ulcerated and is associated with a serous, mucinous, purulent or bloody discharge. Colour can vary and has been described as white, bluish violet or brownish red. Generally the nodule is painless to palpate, unless the overlying skin has ulcerated. The patient may complain of pruritus. The size is usually less than 5 mm, although larger tumours have been reported, as the nodule grows to form a protruding tumour (Dar et al, 2009).

Menzies et al (2015) reported a case of Sister Mary Joseph nodule in a patient with no visible umbilical nodule, only a palpable subcutaneous nodule found on close examination. Computed tomography scanning revealed a pancreatic mass with liver metastases and histology confirmed a metastatic pancreatic adenocarcinoma.

Clinical approach

When faced with an umbilical nodule, careful clinical assessment is required, keeping in mind the differentials of an umbilical nodule and the potential for it to represent metastatic disease. The approach should be to determine if the nodule is benign or malignant and, if malignant, primary or secondary. The authors advocate that a detailed history is imperative, focussing on alarm symptoms (weight loss, constitutional symptoms, dysphagia, abdominal pain, haematemesis, change in bowel habit, rectal bleeding, haematuria, vaginal bleeding) as well as a full systems enquiry. Previous past medical history, smoking and family history should be ascertained.

This should be followed by a thorough clinical examination noting the presence or absence of cachexia, lymphadenopathy, digital clubbing, and abnormal findings on cardiorespiratory and abdominal examination. A digital rectal examination should be documented. Relevant blood tests and tumour markers should be undertaken. The authors advocate the need for cross-sectional imaging as early as possible within the diagnostic pathway to further assess the nodule and identify and stage a potential primary tumour.

Figure 1. Sister Mary Joseph nodule.

The use of fine needle aspiration provides a high diagnostic yield; the sensitivity of fine needle aspiration in diagnosing a malignant nodule has been reported as 98.2%. The same authors reported the positive predictive value of a fine needle aspiration cytological finding of malignancy was 100% (Edoute et al, 1990). Fine needle aspiration and cytological examination is advocated as the first diagnostic procedure, as it is simple, fast, inexpensive and relatively non-invasive, and may avoid the need for more invasive percutaneous biopsy (Handa et al, 2008).

Prognosis and management

The Sister Mary Joseph nodule is associated with a poor prognosis. A few studies have indicated the length of survival in untreated patients to range from 2–11 months (Majmudar et al, 1991). However, it is important to bear in mind the different factors that influence prognosis. Treatment varies according to the underlying malignancy. Some studies have shown that the time at which the umbilical lesion was detected has some effect on the survival, i.e. there was some improvement if the lesion was detected before definitive treatment (Poncelet et al, 1996).

There have been different arguments regarding the type of management of these patients. Initially it was thought that palliative treatment was the mainstay of management because of the poor prognosis that the nodule insinuated. However, it has been demonstrated that the combination of surgery and adjuvant therapy results in better survival (21 months) than with just either surgery (7.4 months) or chemotherapy (10.3 months) (Gabriele et al, 2005). An individualized, multidisciplinary approach is required when managing these patients. **BJHM**

Figure 1 *is reproduced from Miller et al (2015) by kind permission of BMJ Group.*
Conflict of interest: none.

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KEY POINTS

- The Sister Mary Joseph nodule describes a metastatic umbilical lesion.
- Umbilical lesions can be benign (57%) or malignant (43%).
- The majority of malignant umbilical lesions are secondary, metastatic lesions.
- Over two-thirds of cases are related to an underlying abdominopelvic malignancy.
- Focussed clinical examination, relevant blood tests, cross-sectional imaging and cytopathological assessment should be performed urgently in a patient with an umbilical nodule, given its potential to represent metastatic disease.
- The Sister Mary Joseph nodule carries a poor prognosis.
- Management varies according to the underlying malignancy and requires a multidisciplinary approach involving surgeons, oncologists and palliative care teams.