

## Cullen's Sign

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**C**ullen's sign, or periumbilical ecchymosis, is associated with hemoperitoneum and may present with a myriad of disorders (**Sidebar**). First described by Cullen in 1918,<sup>1</sup> this sign has become classically associated with hemorrhagic pancreatitis<sup>2</sup> but can be seen with a host of other intra-abdominal processes. Grey Turner's sign, or ecchymosis of the flanks, may also occur in conjunction with Cullen's sign, especially in cases of retroperitoneal hemorrhage.<sup>3</sup>

### **PATHOPHYSIOLOGY AND CLINICAL PRESENTATION**

Periumbilical ecchymosis usually results from hemoperitoneum, and the diffusion of blood along periumbilical tissues produces the discoloration around the navel.<sup>4,5</sup> Diffusion of blood via the falciform ligament may also produce periumbilical blood staining. This discoloration is typically blue or purple (**Figure 1**) but may occur in various shades of green or yellow depending on the stage of erythrocyte breakdown. A suggested mechanism of action is pancreatic enzymes reacting with abdominal adipose tissue, but this theory does not account for periumbilical ecchymoses presenting in the absence of pancreatitis; hence, this theory is not widely accepted.<sup>6</sup>

### **CONDITIONS ASSOCIATED WITH CULLEN'S SIGN**

Although hemorrhagic pancreatitis is the classic condition associated with Cullen's sign, a variety of other disease processes have also been reported in association with this physical finding (**Table 1**). Cullen<sup>1</sup> first described the association between periumbilical ecchymosis and ruptured ectopic pregnancy in 1918.<sup>1</sup> Severe pancreatitis may be associated with parenchymal hemorrhage, which may extend along tissue planes to the umbilicus. A study by Dickson and Imrie<sup>6</sup> noted Cullen's sign in 2% of patients with acute pancreatitis.

Several other intra-abdominal conditions, such as splenic rupture, aortic rupture, malignant liver disease, and perforated ulcer, may be associated with Cullen's sign as well.<sup>7-9</sup> In fact, any condition resulting in hemoperitoneum may lead to diffusion of blood along fascial planes to the periumbilical tissues.<sup>4</sup> The finding of periumbilical blood staining in a patient with abdomi-

### **CULLEN'S SIGN**

**Definition:** Periumbilical ecchymosis that typically occurs in the presence of hemoperitoneum, hemorrhagic pancreatitis, or uterine tube rupture in ectopic pregnancy.

**Physical findings:** Bluish discoloration or ecchymosis around the umbilicus; abdominal tenderness may also be present in cases of significant intra-abdominal disease, and patients may also have flank ecchymosis (Grey Turner's sign) if retroperitoneal bleeding is present.

nal trauma should prompt the exclusion of significant intra-abdominal injury with modalities such as diagnostic peritoneal lavage, ultrasound, computed tomography, or surgical exploration.<sup>10</sup> Physicians should note, however, that the absence of periumbilical ecchymosis does not exclude hemoperitoneum.

### **DIFFERENTIAL DIAGNOSIS**

Periumbilical cellulitis typically causes blanching erythema that is warm to the touch. Sister Mary Joseph's sign, or metastatic spread of an intra-abdominal malignancy to the umbilicus, may present with thickening and erythema of periumbilical skin or as a palpable mass lesion around the umbilicus.<sup>11</sup> Subcutaneous administration of heparin may result in abdominal wall ecchymoses, which are typically distant from the umbilicus. Patients with psoriasis may develop periumbilical erythema with a silvery scale that bleeds on removal (Auspitz sign). Endometriosis with umbilical involvement accompanied

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Figure 1. A rare case of periumbilical ecchymosis in a patient with metastatic thyroid cancer.

by hemorrhage in conjunction with the menstrual cycle may occur rarely. Ulceration of a recanalized umbilical vein in the setting of cirrhosis may cause periumbilical skin darkening.<sup>7</sup>

Less common conditions that may involve the umbilicus include adenocarcinoma of urachal remnants and squamous cell carcinoma.<sup>11</sup> However, these conditions are quite rare and with careful examination, differ from the ecchymosis seen with Cullen's sign. HP

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Table 1. Conditions Associated with Cullen's Sign

Pancreatitis
Ruptured ectopic pregnancy
Ruptured aortic aneurysm
Ruptured spleen
Ruptured common bile duct
Perforated duodenal ulcer
Hepatocellular carcinoma
Hepatic lymphoma
Metastatic thyroid cancer
Percutaneous liver biopsy

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