

The “teardrop sign”

Paul C. Williams,¹ Todd R. Williams,¹ and Daniel T. Myers¹

¹Department of Radiology, Henry Ford Hospital, Detroit, MI 48202, USA

The “teardrop sign” describes the appearance of superior mesenteric vein (SMV) tumor involvement in the setting of pancreatic head adenocarcinoma. It refers to the characteristic teardrop shape, with both a rounded end and a pointed end (Fig. 1). The teardrop shape of the (SMV) reflects tumor tethering the vessel so that on axial images the SMV will change from its normal rounded shape to that of a teardrop (Fig. 2). The sign is predictive of venous involvement, with the inability to dissect the tumor from the SMV [1]. In the absence of the teardrop sign, venous involvement by pancreatic adenocarcinoma generally has been defined by tumor contacting greater than 50% of the vessel circumference [2, 3]

In the past, the teardrop sign on multidetector CT angiography was determined to be a reliable indicator of SMV involvement, and a predictor of unresectability of pancreatic head adenocarcinoma [2]. The pathophysiology of this process is hypothesized to be desmoplastic or malignant encasement of SMV, either by peritumoral fibrosis or direct tumor invasion <leading to vessel distortion/tethering [1]. In one study, the teardrop sign as an indicator of tumor involvement of the SMV was highly specific at 98%, and 76% sensitive with a positive predictive value of 95% [1].

Currently, many tertiary care hospitals have now gained expertise in performing portal and superior mesenteric vein resections and reconstructions. Venous invasion is no longer considered an absolute marker of unresectable tumor [4, 5].

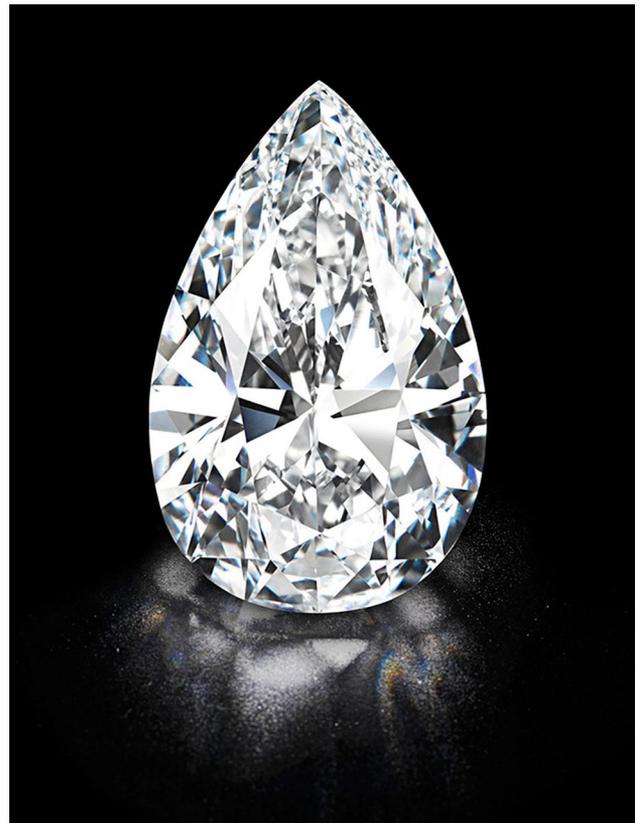


Fig. 1. This large teardrop- or pear-shaped diamond having a rounded end and a more pointed end, similar to the shape of a tethered SMV in pancreatic cancer.

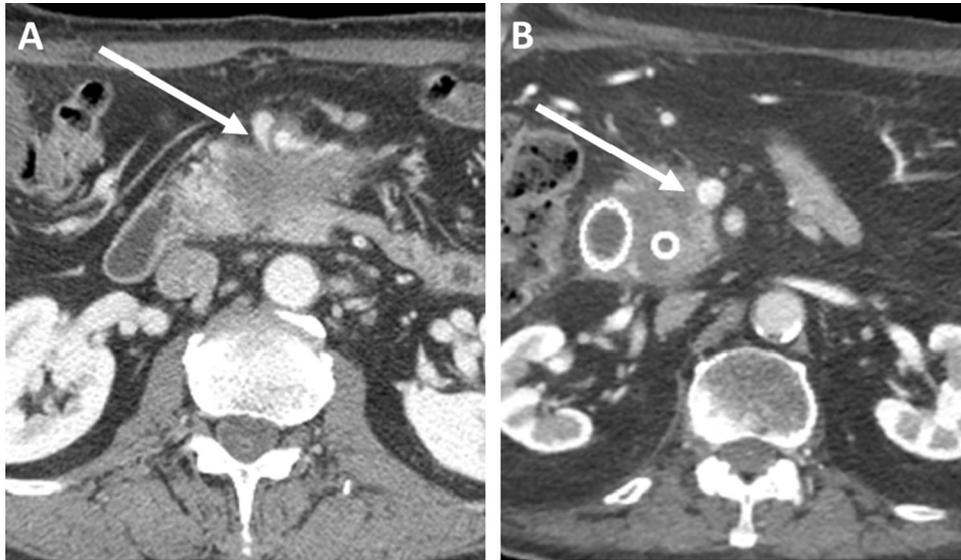


Fig. 2. Axial multidetector contrast-enhanced CT (**A**) illustrating the teardrop appearance of the SMV (white arrow) highly suggestive of venous involvement but with 50% of vessel contact with the pancreatic head adenocarcinoma. Axial multidetector CT in a different patient (**B**) demonstrates

50% contact of the tumor with SMV with a normal round appearance to the SMV (white arrow) consistent with abutment. Stents are present in the common bile duct and duodenum.

Compliance with ethical standards

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Conflict of interest The authors declare they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent Statement of informed consent was not applicable since the manuscript does not contain any patient data.

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