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Short Communication

Skeletonization (VS) in Lieu of Portal-Mesenteric Vein Resection (VR) during Pancreaticoduodenal Resection (PDR)

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"All truth passes through 3 stages. First it is ridiculed, second it is violently opposed, and third it is self evident" Arthur Schopenhauer.

Why do operations learned in residency remain entrenched long after insights and progress suggest many should be modified or abandoned? [1]. Tradition is strong and too often trumps surgical progress [2]. The changes may be technical, conceptual or both. Most often they are evolutionary and less often revolutionary (Disruptive Innovation) [3]. Obvious examples are minimal operations for breast cancer, dietary treatment to prevent and reverse coronary artery disease (CAD) in lieu of stenting and bypass surgery, mesh repair of inguinal hernias, endoscopic rather than surgical treatment of biliary diseases, and laparoscopic rather than open approaches for abdominal and thoracic diseases [1,4-8]. The evolving technical changes embrace lesser procedures and multiple disciplines.

The stalwarts of "big" operations believe local approaches are the prime determinants of outcomes for malignancy. CaP, the most lethal solid cancer is a prime example [9,10] and for the past century, surgery was held to be the best and only chance of cure [9,10]. Failure after standard resection has led to extended procedures in which contiguous organs, additional lymph nodes and major veins (VR) and arteries (AR) are resected [11-15]. The advocates believe wider resection, and clear margins (RO) improve chances of cure. Unfortunately, morbidity and mortality may be greater and long term survival is not improved [16]. Verbeke believes margin free (R0) specimens are more dependent on the pathologist than the surgeon [17]. The more thorough the pathologist, the more margins are involved. This may explain the wide range (14-85%) of involved margins after PDR [17,18].

This commentary was prompted by our experience and advocacy for vein skeletonization (VS) rather than vein resection (VR) of the mesenteric -portal vein during PDR [19]. When imaging suggests major vessel encasement or narrowing in CaP we prefer neoadjuvant therapy as initial treatment [20,21]. Arterial resection (AR) is difficult to justify because of higher morbidity, mortality, and limited survival that is comparable to non resected patients [13,16]. Since many lesions in the head of the pancreas are contiguous to, or abut, displace, narrow, surround and obstruct the portal - mesenteric vein, treatment of the pancreas- vein interface has spawned an aggressive surgical approach. VR adds time, complexity and risk to PDR, and could be justified if it was low risk and improved long term survival [16].

Skeletonization of the vein implies dissection of the SMV from the pancreas, leaving an intact vein, and is done when lesions abut, displace, or impinge on the SMV [19]. Our interest in VS, dates to 1990 when we treated CaP patients with encased, narrowed and occluded SMV-PV, with chemo-radiation therapy [9]. Previous experience taught us there was little to be gained by VR. In 2 patients with complete SMV-PV obstruction there was complete tumor resolution and a patent vein after treatment, suggesting the cancer caused vein obstruction by compression and not invasion [20]. The veins were skeletonized during margin negative PDR.

SV or VS is determined by CT-angiography, and operative experience; and supported by patient outcomes. The CT angiogram should demonstrate a free interface between the anterior SMV and neck of pancreas, and a displaced or abuted SMV [22]. SV is begun after the neck of the pancreas has been divided and the head and uncinate of the pancreas mobilized [19,20]. The SMV is teased from the pancreatic border, with a vascular dissector (Freer) and small venous/arterial tributaries are clipped and divided, until the pancreas is completely free. The dissection starts at the lower border of the pancreas where the medial wall of the SMV is easily identified. In 232 consecutive PDR, including 101 CaP (20 after neoadjuvant chemo -RT) VS was safely applied when needed in lieu of VR. If the final pathology showed tumor at the pancreas margin, adjuvant therapy included radiation [19,20]. After neoadjuvant therapy in resected cases the excised lymph nodes and margins were invariably negative.

Determining vein involvement by preoperative imaging is subjective. Nakao et al correlated preoperative imaging and specimen findings in 297/463 (65%) PDR [23,24]. Pathology of the resected veins were classified by depth of tumor infiltration and were; 0 (negative); 1 (adventitia); 2 (media); and 3 (intima). Preoperative vein involvement was classified as (A-D) and were uninvolved (A) in all 19 resected veins of 111 preoperative normal veins; but were involved in 42/82 (51%) of unilaterally narrowed (B) veins; in 72/97 (74%) of bilaterally narrowed (C) veins and in 63/68 (93%) of completely obstructed (D) veins. Long term survivors had normal or minimal vein changes, and resected veins were uninvolved, or superficially involved. Operative mortality was low, but higher after VR-PDR (2.1%) vs. standard PDR (0.6%) [23]. Deeper vein involvement

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portended poor survival, as tumors were higher grade, and less differentiated [16,23-26]. Another study of 156 PDR's included 54 with VR; 8 (15%) had no vein wall involvement, 19 (37%) were involved and 27 (50%) had no pathology reported of the resected vein. VR was associated with longer operations, more transfusions and fewer R0 resections (30%) [26]. Others believe vein resection adds little time, risk, morbidity, or mortality to PDR [16]. How can that be? Extending any operation adds time, and real or potential risk, particularly when excision of a short lateral segment of the vein wall is not possible and a circumferential resection necessary. As for survival, it might be more accurate to state it is equally poor with or without VR. Barreto and Windsor in a thorough review of VR during PDR surmised it was "only justified when two criteria were met: an R0 resection with low morbidity and mortality, and no direct invasion of the vein wall [16]."

Since the correlation between predicted and actual vein wall involvement is variable, and 50% of resected veins are uninvolved, and there is no survival benefit to resect involved veins, we impose strict radiologic and patient criteria before PDR, and initiate VS before VR.

Since PDR and PDR-VR/ VS are local therapies in a systemic disease, the cure rate is minimal. Developing technologies that ablate tumors in situ may compete with or complement traditional surgery to treat solid tumors [1]. The common cause of death for CaP is metastatic disease often detected within months of resection. The century old emphasis on cure of CaP by PDR is fruitless [10]. Shutting the barn door after the animals escape and disperse is analogous to curing CaP by surgery alone; too little, too late.

Even "incidental" lesions found by body imaging may be smaller and earlier, but are not early findings [9]. The overdue emphasis on risk reduction and prevention of pancreatic and other cancers by lifestyle change would redirect the dialogue and interest from therapies that rarely cure to prevent or lower the incidence of pancreatic and other cancers by lifestyle changes especially nutrition. If tried and were unsuccessful, the "side effects"; a reduction in hypertension, cardiac disease, stroke, obesity, arthritis, and improvement of overall health would be well tolerated and far different than the side effects of most drugs or surgery [9]. Until then, an open minded approach and critical analyses of actual survival and cure and not projected survival for pancreatic and other cancers will dictate what traditions should be kept, questioned or abandoned.

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