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SURGICAL TECHNIQUE

Falciform ligament wrap during laparoscopic pancreatoduodenectomy



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Introduction

The falciform ligament wrap has been proposed to decrease the risk of bleeding complications after pancreatoduodenectomy (PD) [1], and a controlled randomized trial on its use is currently underway [2]. This technique has also been described to decrease the risk of pancreatic fistula [3,4]. It can also be used as an alternative to omentoplasty in case of perforated gastroduodenal peptic ulcer [5], to fill the space left after hepatic resection or to close large hiatal hernia defects [6]. Lastly, it can be used for bile duct injury repair [7].

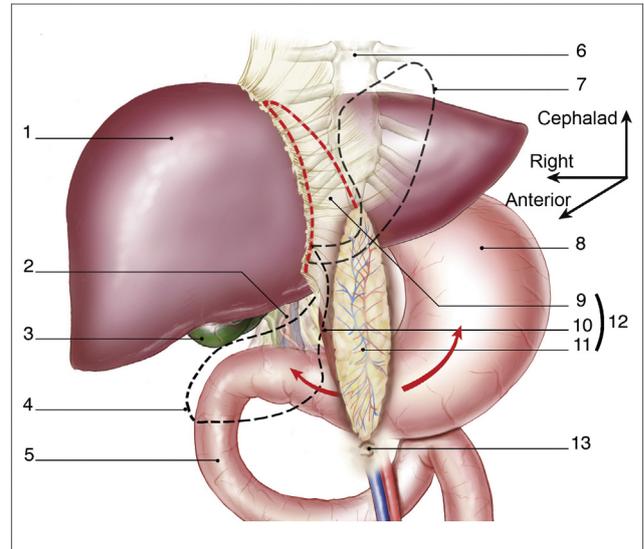
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1 First step

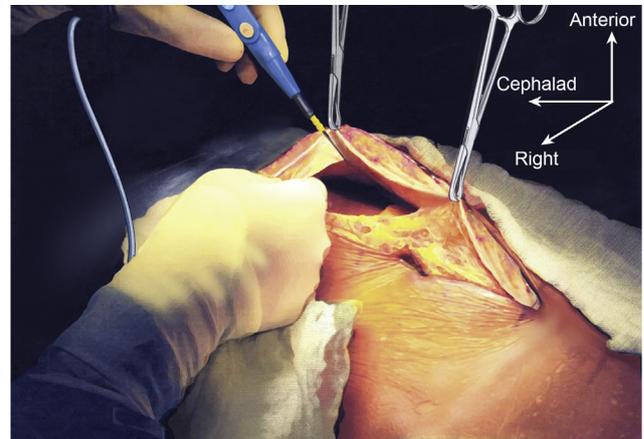
The flap is simple and quick to create and raise; it is well vascularized and can be used anywhere in the right upper quadrant of the abdomen. It is composed of a broad tissue flap (falciform ligament and preperitoneal fatty tissue), which is vascularized by the round ligament [8]. After complicated PD, it can be used to cover the exposed vessels to limit the risk of pseudo-aneurysm in case of pancreatic fistula.

It is not necessary to change patient position on the operating table to create it. The flap can be raised whatever the approach: midline, subcostal or laparoscopy. However, the decision to do so should be made early, as the first step of the operation. It is therefore important to foresee its need, protect it once it is ready, and use it at the end of the operation.



2 Second step

Via a midline incision, the linea alba is opened from the xiphoid to the umbilicus. The preperitoneal fatty tissues are retracted cephalad. At the junction between the fatty tissues and the fascia, electric cautery dissection is directed laterally until the fatty tissues disappear (approximately 5 cm on each side), the peritoneum is divided from the umbilical fatty tissues to the xiphoid.



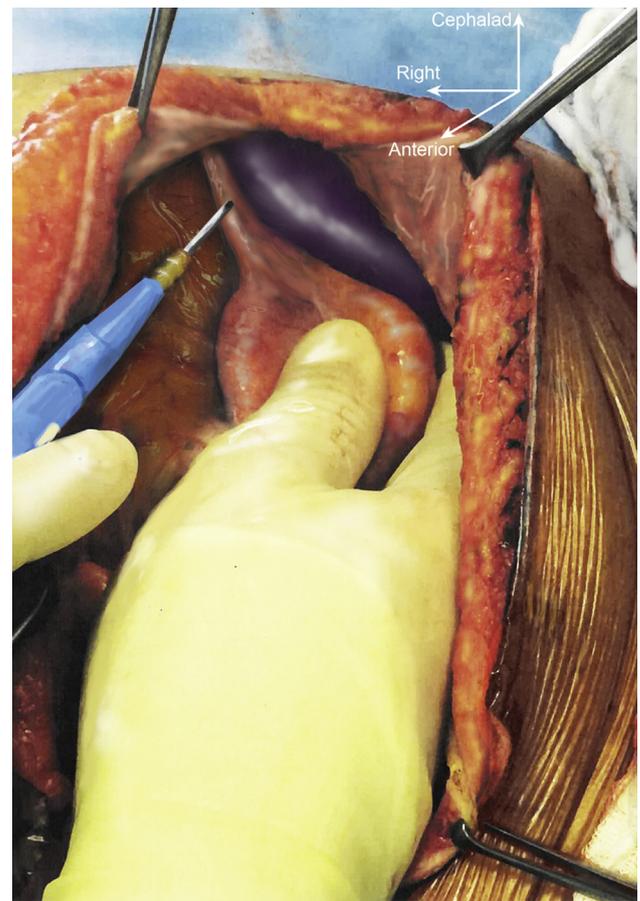
3 Third step

This step is performed in the same manner on the left as on the right. At the level of the umbilicus, peritoneum and fatty tissues are ligated with absorbable sutures and then divided. Beyond the xiphoid, the fatty tissues have to be divided to reach the falciform ligament close to the diaphragm.



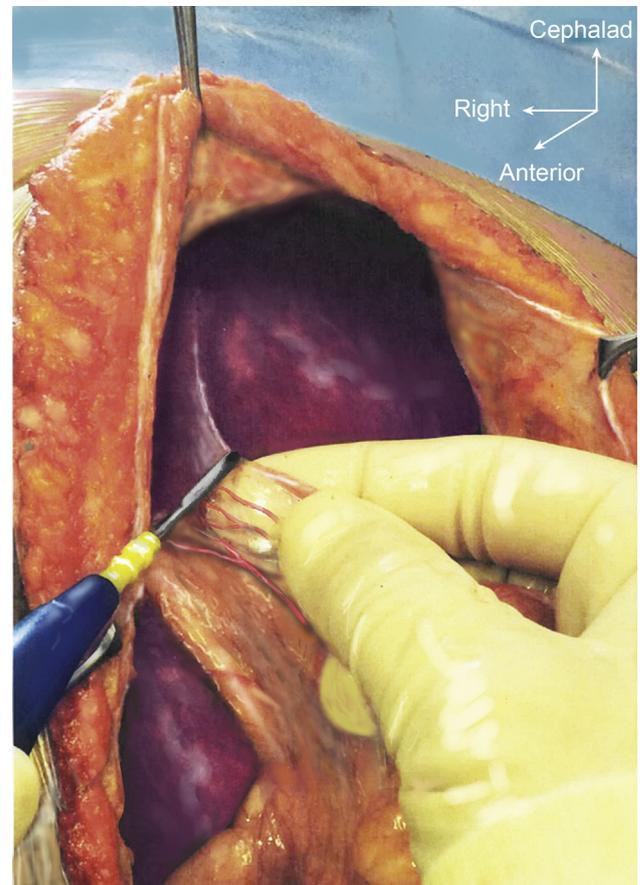
4 Fourth step

The liver is pushed posterior to put the falciform ligament under tension before dividing it with electric cautery near the diaphragm from anterior to posterior.



5 Fifth step

The falciform ligament is thus divided near the liver. It is however important not to cut the falciform ligament too close to segment IVb because there are several small feeding vessels that, if interrupted, can lead to partial ischemia of the flap.



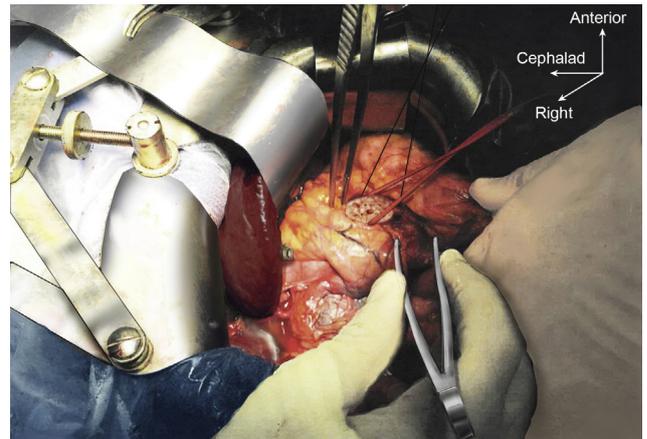
6 Sixth step

To best preserve the flap, the round ligament must not be twisted and the flap must not be compressed. The flap is placed in a humid and warm gauze. It should be placed in front of hepatic segment IVb in order not to hinder any later part of the procedure and avoid any biliary contamination.



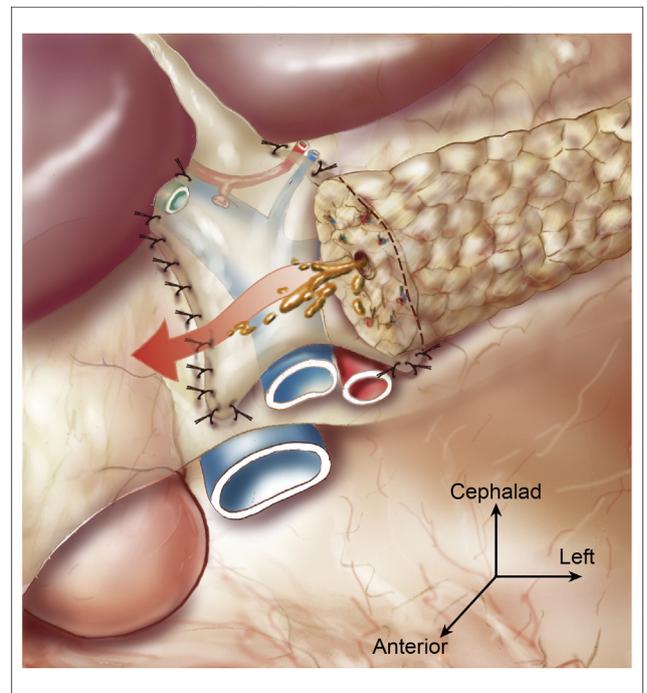
7 Seventh step

The flap is fixed in position before performing the pancreatic anastomosis, after checking that it is well vascularized and that the pancreatic stump and the common hepatic duct are adequately mobilized (2 cm for the pancreatic stump and 1 cm for the common hepatic duct). Whatever the type of anastomosis, the palette of the flap is placed horizontally to cover the exposed vessels. It should be first fixed to the superior then to the inferior border of the pancreas, approximately 2 cm from the pancreatic division. Next, the flap is anchored (interrupted absorbable sutures) in a counter-clockwise direction to cover the area of lymph node dissection (superior border of the pancreas to the superior border of the hepatic pedicle, the common hepatic duct anterior to the flap, then Gerota's fascia and finally from the inferior mesenteric vein to the inferior border of the pancreas).



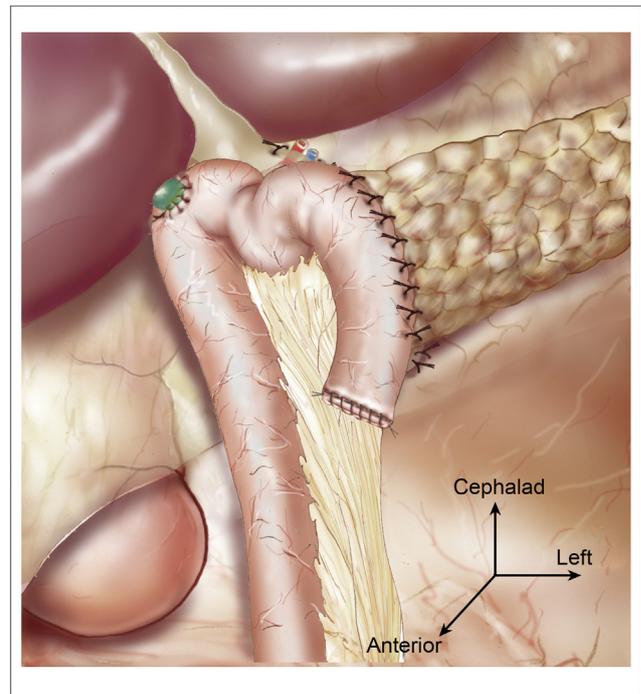
8 Eighth step

The flap protects the vessels and facilitates the evacuation of pancreatic fluids by realizing a sort of "amylase toboggan".



9 Ninth step

Last, the operation is pursued as usual to perform the pancreatico-jejunostomy, hepatico-jejunostomy, gastro-jejunostomy and drain insertion.



Disclosure of interest

The authors declare that they have no competing interest.

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