

## The Catastrophic Use of a Retractor

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### 1. Abstract

An adolescent boy suffering from a large retroperitoneal tumor (later found to be a Ganglioneuroma) was operated for tumor excision. Removal was difficult and in order to ease dissection and freeing of the tumor, the assistant's retractor was, for a long and continuous time, kept retracting the biliary pedicle. That, inadvertently, blocked the blood supply to the biliary tree and led to necrosis of those structures deprived of blood circulation and so leading to severe complications (that almost resulted in the death of the Patient). That well demonstrated the essential need to relax intermittently the retractor and also to be conscious of the need to make sure that sufficient blood supply is assured to all "retracted" structures.

### 2. Introduction and Objectives

To alert for the possible catastrophic danger of the lengthy use of an abdominal retractor, and other pitfalls.

### 3. Material and Methods

12 years old caucasian girl presenting with a very large retroperitoneal tumor, in the midline, from the diaphragm to the aortic bifurcation (Figure 1). FNAC proved it to be a ganglioneuroma, tumor markers being normal (VMA, NSE, Ferritin)

She was operated through a large supraumbilical laparotomy on the 24th February 2005. The colon, the duodenum, as well as the porta hepatis and the pancreas were reflected to the left, followed by dissection over the spine and freeing the tumor from the mass from behind the vena cava, as well as from the aorta and celiac axis. As dissection progressed behind the pancreas (displaced forward and to the left), and until the tumor was completely freed from the celiac axis, the porta hepatis was continuously held by vessel loops and the abdominal retractor (to better expose the

tumor and ease dissection) (Figure 2). A silastic tubular abdominal drain was placed. Operation lasted about 5 hours but, at the end, everything seemed excellent, with a stable Patient.

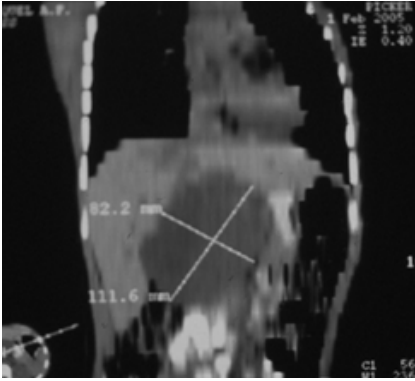
Nevertheless, the immediate postoperative period was stormy and there was marked biliary drainage through the drain, which led to a second laparotomy, performed on the 15th March (a fortnight later). At operation total ischemic necrosis of the bile duct and gallbladder were found (Figure 3), requiring their resection and the placement of a Roux en Y loop, which was anastomosed to the common trunk of the hepatic channels catheterized with tubular drains, exteriorized through the umbilical scar. She was kept on TPN and permanent, low pressure, naso-gastric drainage.

On the 3rd postoperative day her condition worsened and she was admitted to the ICU with a diagnosis of sepsis in a context of chemical peritonitis. On the 20th postoperative day she had important melaena but remained hemodynamically stable.

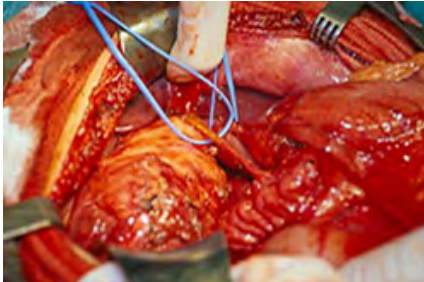
Next day a further laparotomy was performed and a fistula sutured at the porta hepatis (Roux en y loop), the tubes from the biliary ducts being removed. Bleeding seemed apparently controlled.

On the 18th March chest drainage was placed in the left chest due to the appearance of a small pleural effusion, and *Candida Albicans* was cultured.

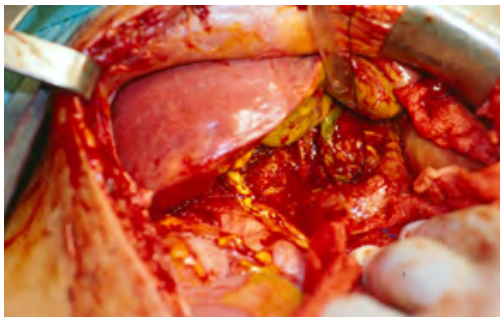
On 20th March a scintigraphy showed images suggestive of active lower abdominal bleeding, probably from the intestine. Three days later there was blood in the NG aspirate, but no blood coming from the abdominal drain. In doubt she had another exploratory laparotomy and several solid clots were found in the abdominal cavity, but no bleeding point was detected, although there was diffuse oozing from the wound's surface. 2 abdominal drains were placed through separate wounds.



**Figure 1:** Huge retroperitoneal Ganglioneuroma.



**Figure 2:** Tumor bed: loops on the bile duct and porta hepatis.



**Figure 3:** Necrotics Bile Duct and Gallbladder.

On the 28th March hg was 8.1, APTT 56,6, TP 42%, Fibrinogen 239, Platelets 187.000 and FPD raised.

Active gastric hemorrhage as well as coagulation problems persisted, in spite of multiple plasma and packed cells transfusions. On the 29th March for the probable presence of circulating inhibitors, she was medicated with immunoglobulin (400 mg/Kg/day), Prednisolone (60 mg/m<sup>2</sup>/day) for 5 days, Aminocaproic Acid (3g in 200 ml serum). At that time all Clotting Factors (Iic, VE, VIIIc, IXc, Xc, XIIc, and XIIIc) were within normal limits, except for a low rFVII (19% r.v. = 53/111So, rFVIIa. was also stated (90 microg/Kg every 2-2 hours (and progressively at larger intervals).

On the 30th of March rVIIa was 210c and rVII aú was 320c. On the 14th April the administration was stopped as the bleeding tendency was finally controlled.

rVIIa in this patient seemed to have worked, at letpartly, unspecifically, by enhancing the generation of thrombin on activated platelets, facilitating the formation of a tight fibrin plug, resistant to premature lyses, considering that the Patient had not had previous bleeding tendencies (although she had suffered severe hepatic

ischemia, when the retractor was held too long, when aiming at a good surgical exposure).

On the 31 March there was no drainage through the abdominal drain, suggesting integrity of the porta hepatis anastomoses. The abdomen was tense and oedematous, and there was abundant drainage of slightly blood stained exudate. The left chest drain was removed.

On the 1st April, due to an apparently persistent gastric hemorrhage (NG aspirate), the Patient had a Gastroscopy. There was a large intragastric clot, at the transition to the gastric fundus, but no bleeding point was found. By the end of the examination, done under the usual insufflation pressure (probably excessive and to be avoided when there is a “locus minor resistencia”) an air leak appeared at the level of the abdominal drain, suggesting gastric or duodenal rupture, and prompted a new exploratory laparotomy.

A transverse laparotomy was performed, which had to be complemented by a vertical incision to allow for adequate exposure (Figure 4). The liver was adherent to the abdominal wall. An hepatic biopsy was performed. The stomach was open in its anterior wall, with total exploration from cardia to pylorus, and no active hemorrhage was found. A small air leak, from rupture at the 2nd portion of the duodenum, near the previous coledocus implantation (previously sutured) was found and a new closure was performed. The top of the Roux en Y loop suture to the liver was reinforced.

On the 11th April she was started with a continuous perfusion of Octreotide, with the aim of reducing the production of bile and help control the hemorrhage, which was stopped on the 5th May, after gradual reduction.

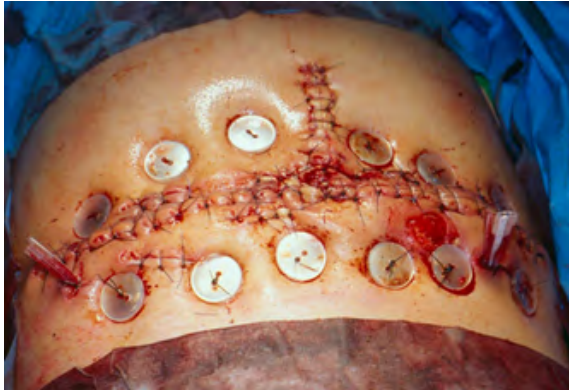
There were evident radiological signs of hepatic necrosis, although with sufficient amounts of normal hepatic tissue.

On the 20th April contrast media introduced through the NG tube revealed a fistula in the 2nd portion of the duodenum, in continuity with the drainage area. One hoped that the fistula would close, spontaneously, with time, as the amount of drainage was diminishing.

On the 22nd April methylene blue was administered through the NG tube and no blue was detected in the drainage. Oral contrast media showed the presence of a small “recessus” in the 2nd portion of the duodenum, but well localized. A repeated barium swallow, made some months later, showed that the “recessus” had disappeared.

On the 8th June she had a negative blood culture, Hg 8.7, GOT 1087, Total Bil 3.26 mg/dl and direct 1.84 mg/dl, Prot 5.6 and albumin 2. All along she had infections with E. Coli, Staph Epidermidis, and Candida Albicans that where treated with multiple appropriate drugs.

She was kept ventilated from admission on the 14th March to the 8th of April, She had TPN till 10th May (through a CV line) and only then was started on oral feeding.



**Figure 4:** Complementary vertical incision, for better exposure, and the use of buttons to ease tension on the suture line.

She required pedo-psychiatrist s support.

On 4th July she had melaena and her hemoglobin had dropped again (6.6 dl) and she was readmitted to the ICU with the diagnoses of upper abdominal bleeding (10 lead to rupture of a recent no evidence of cholangitis. She was discharged home on the 19th of July.

#### 4. Results and Discussion

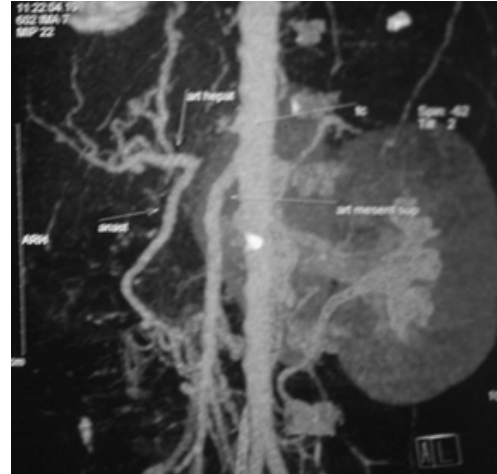
On the 10th July an aortogram was performed: the splenic and superior mesenteric arteries were normal, there was interruption of the hepatic artery, which opacified through the superior mesenteric artery. The R gastroepiploic artery opacified through the splenic artery. In the venous phase, the portal vein could not be demonstrated. There were no signs of active hemorrhage.

That was followed by an AngioMRI which showed good R and L portal veins, probable thromboses of the main portal branch, and good vena cava, aorta and superior mesenteric artery and vein (Figure 5). That might allow later, if required, a future “curative” shunt, to the Patient’s presently mild portal hypertension.

She has gained weight and is looking well, although with occasional complaints of abdominal pain, probably due to cholangitis. CT now does not show anymore the areas of ischemic necrosis previously observed, although liver function tests remain slightly raised. Coagulation test and Hemoglobin are now normal. She has a moderate degree of portal hypertension (esophageal varices grades I and II and a “significant” gastric varix), but with apparently good liver circulation. She has had occasionally bleeding, but apparently not esophagogastric.

#### 5. Conclusions

The prolonged use of a retractor, without frequent periods of relaxation, can lead to disaster, as in this Patient. Although excellent and efficacious for helping the acting surgeon in freeing of the tumor, it proved totally unacceptable for the Patient, the really important participant. Hyperpressure insufflation during gastroscopy can lead to rupture of a recently sutured area. The use of rFVII may be life-saving in a severe coagulopathy. The use of buttons may be very useful to relieve tension at the suture line.



**Figure 5:** Hepatic artery supplied through the superior mesenteric artery allowing for a good blood supply to the liver.

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