



ELSEVIER

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en



VISCERAL SURGERY VIDEOS

Damage control surgery: Management of severe abdominal trauma (with video)



J.-H. Etienne^{a,*}, D. Massalou^{b,c,d}

^a Pasteur 2 Hospital, 30 voie Romaine, 06001 Nice, France

^b Pasteur 2 Hospital, University Hospital of Nice, Nice Sophia-Antipolis University, Nice, France

^c Acute Care Surgery Unit, University Hospital of Nice, Pasteur 2 Hospital, Nice Sophia-Antipolis University, Nice, France

^d Biomechanical Applied Laboratory, UMRT24, IFSTTAR, Aix-Marseille University, Marseille, France

Available online 31 August 2018

Damage control surgery is a surgical strategy for most serious multiple trauma patients. It includes quick hemostasis and coprostasis to minimize operating time and improve the survival rate especially with battlefields or mass killings. Practically, injured and unstable patients are transferred to the Trauma center's crash room. Indication for surgical abdominal exploration depends on the context, the clinical examination, and the hemodynamic state. An abdominal echography (FAST) provides first and incomplete data for chest and abdominal lesions, in particular the presence of hemoperitoneum. A massive transfusion is initiated when anemia score is inferior to 10 g/dL. This video displays important steps (from cadaveric dissections to real cases) that are necessary to be followed when performing a damage control surgery for management of severe abdominal traumas. The surgical field included the chest and the abdomen and sometimes femoral regions when penetrating trauma (Figure 1). An incision from pubis to xiphoid was performed. Then, the hemoperitoneum is swabbed with an abdominal packing. Ideally, manual pressure on the lower side of the liver should be performed first and then gradually removed and replaced using compresses. The spleen is pushed against the spine and then the packing is placed on it with further packing placement in the paracolic gutters and the pelvic region. The bleeding should have stopped by this step. Then, compresses from the less to the more haemorrhagic regions can be removed slowly in order to identify the main bleedings' origin(s). An active bleeding from the liver (Figure 2) generally stops after the abdominal packing (Figures 3 and 4). If not, a Pringle maneuver should be performed (Figure 5).

* Corresponding author.

E-mail addresses: etienne.jh@chu-nice.fr (J.-H. Etienne), massalou.d@chu-nice.fr (D. Massalou).

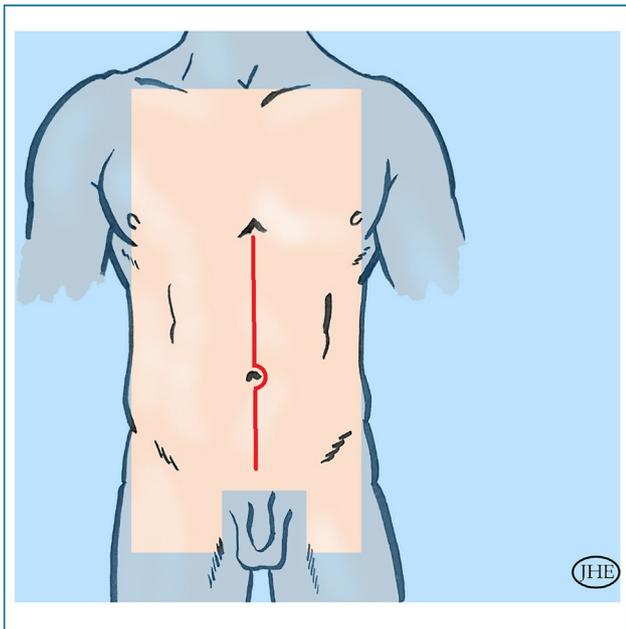


Figure 1. Surgical field for damage control surgery (Drawing by J.-H. Etienne).

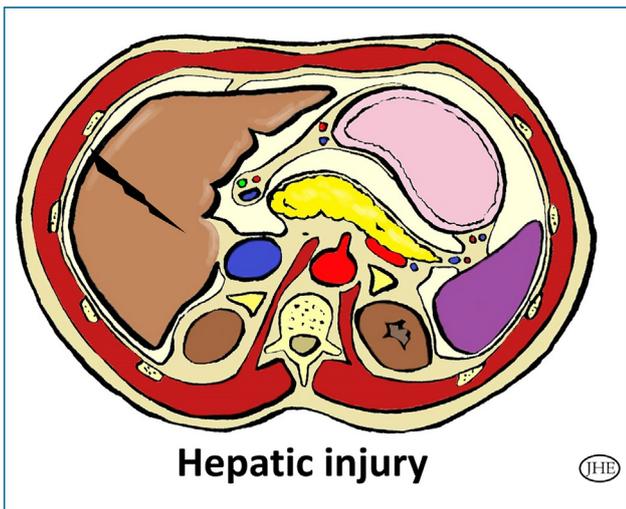


Figure 2. Anatomical slice for hepatic injury (Th12) (Drawing by J.-H. Etienne).

A radiologic embolization or a ligation of the artery could also be performed. For an unstable patient with spleen fracture (Figure 6), a splenectomy should be performed using vascular clamps on the splenic hilum and the short gastric arteries (Figure 7). Then, a small bowel exploration from proximal to distal should be carried on to detect any devascularization, perforation, bleeding or a torn mesentery. If needed, a small bowel without stoma or anastomosis can be performed. For penetrating abdominal traumas, it is important to open the lesser sac for inspection of the posterior side of the stomach and/or the pancreas integrity. Diaphragmatic walls and the retroperitoneal space should be inspected as well. Before closure, the abdominal cavity is washed out with warmed water. Abdominal closure is performed using simple cutaneous stitches or even a vacuum-assisted closure. After damage control surgery, postoperative trauma's lethal triad including hypothermia, acidosis and coagulopathy should be avoided. A second-look surgery should be performed within 2 or 3 days to

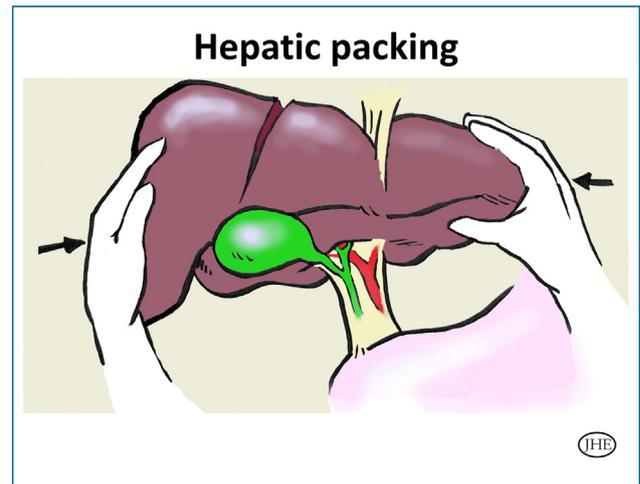


Figure 3. First step for hepatic packing: Hand compression (Drawing by J.-H. Etienne).

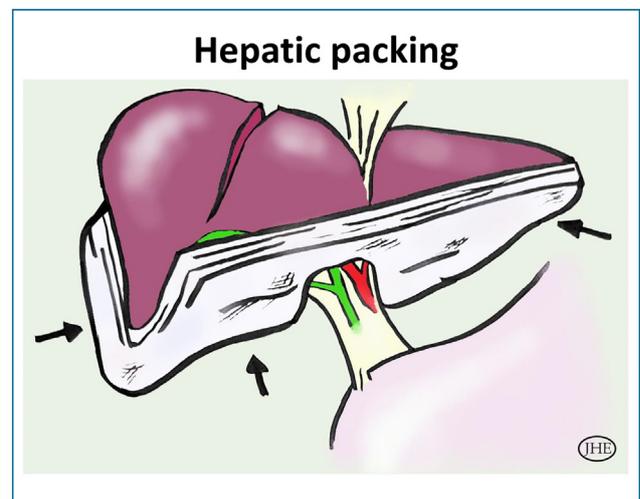


Figure 4. Second step for hepatic packing: Compression by gauze pads (Drawing by J.-H. Etienne).

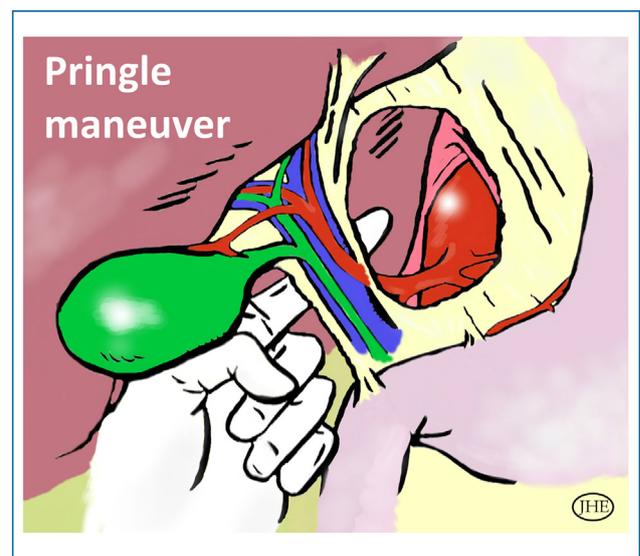


Figure 5. Pringle maneuver: Individualize the hepatic pedicle (Drawing by J.-H. Etienne).

evaluate the digestive viability and integrity, to perform stoma and/or anastomosis, and to complete vacuum assisted closure. Overall, damage control surgery should be considered as part of an emergency multidisciplinary approach to improve the survival rate for patients with most serious polytraumas. This video is useful for surgeons having to perform this specific surgical procedure in emergency.

Appendix A. Appendix A Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.jviscsurg.2018.08.005>.

Disclosure of interest

The authors declare that they have no competing interest.

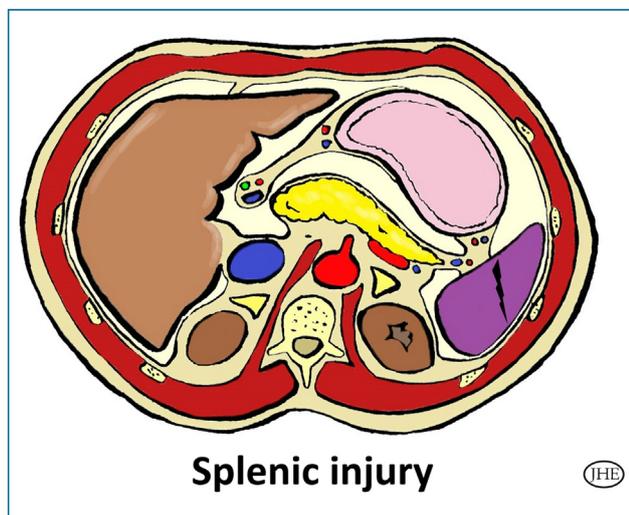


Figure 6. Anatomical slice for splenic injury (Th12) (Drawing by J.-H. Etienne).

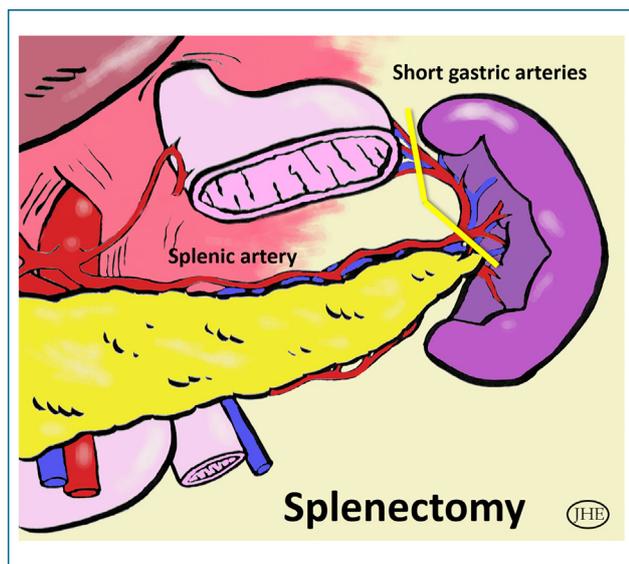


Figure 7. Anatomical view for splenectomy (Drawing by J.-H. Etienne).