

Emergency laparoscopy combined with radiofrequency ablation for hemostasis after percutaneous liver biopsy

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Rezumat

Abordul laparoscopic în urgență combinat cu radiofrecvență în scop de hemostază după puncția biopsie hepatică

În literatură nu există date despre utilizarea radiofrecvenței (RFA) prin abord laparoscopic în urgență ca și modalitate de realizare a hemostazei după puncția-biopsie hepatică. În această lucrare descriem cazul unei paciente cu macroglobulinemie Waldenström și tumoră hepatică voluminoasă, hipervascularizată, care a dezvoltat o hemoragie severă după puncția-biopsie hepatică. Metoda originală de tratament minim-invaziv a constat într-un abord laparoscopic, cu introducerea trans-cutanată a sondei de radiofrecvență la nivelul orificiului biopsiei. Chiar în condițiile unei coagulări deficitare, hemostaza este sigură și rapid instalată. Abordul laparoscopic combinat cu radiofrecvență evită o laparotomie inutilă în cazul hemoragiilor cu sursă cunoscută, putând constitui o metodă optimă de asigurare a hemostazei, inclusiv la pacienții pentru care biopsia percutanată ar fi o procedură riscantă.

Cuvinte cheie: laparoscopie, urgență, radiofrecvență, biopsie hepatică, hemoragie

Abstract

There are no data in the literature on the use of radiofrequency ablation (RFA) in emergency laparoscopy as a means of hemostasis after liver biopsy. In this case report we have described a case of a patient with Waldenström macroglobulinemia and hypervascularised hepatic tumor who developed severe hepatic bleeding after liver biopsy. Innovative, minimally invasive treatment consisted in a laparoscopic approach with introduction of RFA needle into the biopsy site, followed by immediate hemostasis with no complications. Laparoscopic surgery with RFA avoids unnecessary laparotomy in case of severe bleeding from a known source. It is therefore the optimal choice, even in patients for whom percutaneous biopsy would be a high-risk procedure.

Key words: Laparoscopy, Emergency, Radiofrequency, Liver biopsy, Bleeding

Introduction

Percutaneous liver biopsy (LB) may involve complications such as pain, hepatic bleeding (0.2-1.2%), or, rarely, pneumothorax, hemothorax, perforation of neighboring organs, bile peritonitis, infection, or hemobilia (1,2). Less severe hemorrhage, defined as bleeding sufficient to cause pain, reduced blood pressure, or tachycardia, but not requiring transfusion or intervention, occurs in approximately 1 in 500 biopsies (1). Severe bleeding, defined clinically by a change in vital signs with radiographic evidence of intraperitoneal bleeding, becomes evident within 2-4 h, but late hemorrhage can occur even up to 1 week after biopsy (1). The incidence of severe

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bleeding is 1 in 2500-10,000 biopsies in the case of diffuse liver disease, and death related to bleeding has been registered in 1 in 10,000 cases, especially after biopsy of malignant lesions (1). This complication requires hospitalization, transfusion, or even radiological or surgical intervention (1,2). Usually hemostasis is obtained using diathermy for local coagulation or hemostatic material: transarterial embolization with polyvinyl alcohol or acrylic particles, collagen pledgets, autologous blood, or metal coils (3,5). There are no data in the literature regarding the use of radiofrequency ablation in emergency laparoscopy as a means of hemostasis after liver biopsy.

Case report

We present the case of a 61-year-old woman with Waldenstrom macroglobulinemia (lymphoplasmocytic lymphoma with mature B lymphocytes). Following the onset of the disease 2 years previously, she was treated with chemotherapy. She also presented a giant hepatic tumor, which had remained constant under chemotherapy despite favorable development of her general status. Ultrasound-guided liver biopsy - one passage with an 18-G Bard biopsy gun (Bard Biopsy Systems, Tempe, AZ, USA) -- was performed to elucidate the diagnosis. The coagulation parameters were INR 1.91 and platelets 234,000/mm³. On admission (12 hours after LB) the patient displayed transpiration, weakness, and diffuse abdominal pain. Physical examination revealed pallor, low blood pressure (80/50 mmHg), tachycardia (120/min), diffuse abdominal distension, and hepatosplenomegaly. Biochemical analysis showed severe anemia (Hb = 6 g/dl), normal hepatic parameters, slightly elevated white blood cells (WBC = 11,800/mm³), total proteins 11.7 g/dl, gammaglobulin 40.9%, and IgM 2457 mg/dl. Transabdominal ultrasound showed a hepatic hypo-echoic mass 120×60 mm in diameter, poorly demarcated, situated in segments II, III, IV, and V, with central and peripheral arterial vascularization on power Doppler and massive intraperitoneal liquid collection. The diagnosis was hemoperitoneum secondary to LB, with hemorrhagic shock.

The laparoscopic approach with two 10-mm ports (an umbilical camera port and a working port in the right upper quadrant) identified the active bleeding site in the segment IV of the liver, together with a considerable amount of hemorrhagic liquid (3-4 l) and clots in the supramesocolic region of the abdomen (Fig. 1). A radiofrequency needle (StarBurst XL; RITA Medical Systems, Mountain View, CA, USA) was introduced percutaneously into the bleeding biopsy site 2.5 cm deep from the liver capsule. The needle was connected to the RFA generator and power of 120 W was applied for 3 min at a temperature of 105°C (Fig. 2). Immediate hemostasis was obtained, despite the soft texture of the tumor and the coagulation problems. An additional 5-mm port was created in the left iliac fossa to facilitate bowel manipulation and peritoneal lavage. A drainage tube was inserted into the pouch of Douglas via this port and removed 2 days later. Hemostasis was achieved within 10 min from the onset of anesthesia, and the overall operating time was 35 min. No complications were noticed. The patient was discharged three days later.



Figure 1. Laparoscopic approach and percutaneous introduction of the radiofrequency needle



Figure 2. Hemostasis is safe and quickly achieved by delivering radiofrequency energy directly into the biopsy site

Discussion

The principle of RFA by placing an electrode directly in the target area, is to cause ionic agitation, friction, and heat in the surrounding tissue. It results in coagulative necrosis and desiccation over a region of 3 cm in diameter, which can completely obliterate vessels, leading to little or no blood loss from coagulated tissue.

The use of RFA for impeding or preventing blood loss has been tested in animals (6) and previously described in biopsy of renal masses (3) or to facilitate spleen preservation (7) or hepatic segmentectomy (8, 9). The technique of RFA of needle biopsy tract was published in an experimental study and showed reduced hemorrhage after biopsy in the liver and kidney and sustained the impediment of implantation of

tumor cells in the needle tract (10). This case study presents an original, minimally invasive solution for post-liver biopsy bleeding. To our knowledge this is the first published case study describing the arrest of bleeding after LB in a high-risk patient with a hypervascularized tumor by coagulating the biopsy hemorrhagic site during emergency laparoscopy. The penetration depth of the biopsy gun is usually 2.2 cm, so it is important to insert the RFA needle deeper, as we did in our case. In the future, perhaps the use of newly modified biopsy device featuring RFA, already tested in animals, could cauterize the biopsy tract and thus minimize the risk of bleeding and needle-tract seeding in high-risk patients [with uncorrectable coagulopathies, anticoagulation, hypervascular tumors, vascular organ biopsies (i.e., spleen)], when large core samples are being obtained, or when brisk backbleeding is seen from the outer needle (6,11).

In conclusion, laparoscopic approach with RFA avoids unnecessary laparotomy in the case of severe bleeding from a known source and obtains immediate safe hemostasis. It is therefore the optimal choice, even in patients for whom percutaneous biopsy would be a high-risk procedure.

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