Successful endoscopic treatment of biliary leaks after severe gunshot liver trauma in combat abdominal injury

Zarutskyi Y.¹  Slobodyanyk V.² Aslanyan S.¹ Savytskyi O.¹ Tkachenko A.¹ Forostyanyi P.¹ Honcharuk V.¹ Vovk M.¹

Abstract

Objective: The improvement of treatment of liver gunshot injuries, which are complicated by the formation of bile leaks, by applying endoscopic retrograde cholangio-pancreatography and stenting of the bile ducts. 

Patients and methods: The analysis of the treatment of 18 wounded patients with severe gunshot injuries of the liver and the formation of bile leaks was conducted. They underwent endoscopic retrograde cholangio-pancreatography and bile duct stenting.

Results: After endoscopic retrograde cholangio-pancreatography, there was a marked decrease in the amount of bile that drained outwards (by an average of 50.8% for the first day) with a cessation of bile leak after 4 - 6 days. In 3 patients there were limited bilomas formed, which were evacuated via percutaneous puncture under ultrasound guidance. Temporary stent from the common bile duct was removed after 30-45 days in an outpatient setting.

Conclusion: In the surgical treatment of severe injuries of the liver, the frequency of complications associated with bile leaks (bile peritonitis, bilomas, external bile fistula) reaches 86 - 93%. Endoscopic retrograde cholangio-pancreatography allows to determine the source of bile leaks, and endobiliary stenting is the method (surgery) of choice in the treatment of bile fistula. Minimally invasive methods of puncture drainage hemobilomas help to avoid their suppuration, and if the latter - to drain the purulent focus without laparotomy. (TCM-GMJ April 2020; 5(1):P15-P17)

Keywords: Gunshot liver injury; Bile leaks; Endoscopic retrograde cholangio-pancreatography; Bile duct stenting.
nique and biliary duct stenting in the available literature, but the majority of these complications are associated with operations at liver and biliary ducts or peacetime trauma (8, 7, 9). In our study, we paid attention to the treatment of complications of gunshot liver trauma in the system of medical care of forces.

Patients and methods

Analysis of surgical treatment of 18 wounded with severe gunshot injuries of the liver, who were treated in the National Military Medical Clinical Center from 2014 till 2018 years was performed.

All patients had gunshot bullet or shrapnel injuries of the liver as a component of penetrating abdominal or thoracoabdominal injury. Initially, operations were performed at the SME of II level of medical supply, where laparotomy, hysternostosis of liver wound (hemostatic sutures, external, internal or combined packing (plugging), electrocoagulation) had been done. Interventions, associated with other injuries of abdominal organs and structures, thorax in case of thoracoabdominal injuries (pleural drainage installation) had been performed. Operations had been finished by drainage of the abdominal cavity, including perihpatic space. During retrospective evaluation according to AAST score the grade of liver injury was II in 6 cases, III in 10 cases and IV in 2 cases. Re-operations had been performed in 7 cases because of relapse of intraabdominal bleeding from liver wound, and in 8 cases on purpose to remove tampons from the perihepatic space.

Patients were transferred to National Military Medical Clinical Center in 2-17 days after injury (on the average 6-7 days). In all cases, external leakage of bile was observed from the drainages with debit from 200 to 1000 ml (median – 350ml, deviation ± 179 ml). This situation was regarded as the presence of uniformed external biliary fistula with the high debit of bile secretion. All the patients underwent multispiral computed tomography examination of the abdomen with intravenous contrast media to evaluate the level of liver injury, anatomic peculiarities of the injury, condition of intrahepatic and extrahepatic biliary ducts, and other injuries of the abdomen and their complications. Subsequently, diagnostic and treatment endoscopic retrograde cholangio-pancreatography (ERCP) was done with detection of the level of bile leakage source and stenting of biliary duct.

Informed consent for the publication of medical pictures for scientific and educational purposes was obtained from the patients.

Result

After the endoscopic cannulation of the major duodenal papilla, cholangiography was performed. According to cholangiography findings, in 12 cases segmental or small biliary ducts were the source of bile leakage, in 6 cases – right or left hepatic ducts (fig.1).

Endoscopic papillosphincterotomy (EPST) was not performed to preserve the confining function of the Oddi sphincter in the future. Stenting was performed by the conductor with temporary polyvinyl chloride stents 7-10 Fr from 70 to 120 mm in length. Stent was placed to lobular and/or segmental duct in the direction of damaged segments (fig.2).

After the endoscopic intervention, a significant decrease in quantity of bile discharged from external drainages from perihepatic spaces had been observed (on average by 50,8% on the first day) with cessation of bile leakage after 4-6 days.

Perihepatic drainages were removed on 3-5 days after cessation of external bile leakage (fig.3). In 3 patients limited bilomas formed, successfully treated by percutaneous puncture under ultrasound guidance. Temporary stent from the common biliary duct was removed after 30-45 days in an outpatient setting.

Thereby, ERCP with stenting of biliary ducts has shown its effectiveness as a method of prevention of free bile leaking in severe liver injuries.

Discussion

Normal pressure in the common biliary duct is 30-50 mm H2O, passing pressure, required for opening of Oddi sphincter, is 100-180 mm H2O. Exactly such a high level of passing pressure causes bile leakage from damaged biliary ducts from the liver wound surface and biliary leakage formation. As a chemically aggressive fluid, bile hampers liver wound healing, maintains inflammation and can provoke secondary erosive bleeding. The physiological and therapeutic meaning of biliary duct stenting is in eliminating of confining function of Oddi sphincter, which leads to the reduction of pressure in the common biliary duct to the average level in the small intestine lumen (40-50 mm H2O). In this way facilitated internal bile drainage is provided.

Endobiliary stenting was used to treat biliary leaking (18) to create conditions of free bile passage into the duodenum and reduction of pressure in the biliary system. In such cases EPST should be avoided with the aim to preserve the confining function of the Oddi sphincter – the predominant majority of casualties during combat actions are young men without gallstone disease. In the case of biloma (hemobiloma) formation, external percutaneous drainage under ultrasound guidance was performed. Surgical treatment was successful in 17 patients, in whom liver wounds healed without the formation of permanent biliary fistulas and clinically relevant consequences. One patient with severe combined injuries died after long-term treatment at the background of a heavy course of traumatic disease complicated by sepsis.
Conclusions

1. In surgical treatment of severe injuries of the liver according to the “damage control surgery” principle, the frequency of complications associated with bile leaks (bile peritonitis, bilomas, external bile fistula) reaches 86 - 93%.

2. ERCP allows us to determine the source of bile leaks, and endoscopic endobiliary stenting is the method (surgery) of choice in the treatment of bile fistula in case of biliary system drainage has not been performed during previous surgical operations.

3. Minimally invasive methods of puncture drainage of intraparenchymal and other limited liquid accumulations (hemobilomas) help to avoid their suppuration, and if the latter - to drain the purulent focus without laparotomy.

Conflict of interest disclosure

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References


Figure 1: Contrasting of biliary ducts during ERCP and leakage of contrast medium into perihepatic space.

Figure 2. Temporary stent installed into right lobar duct

Figure 3. Histogram of reduction of bile volume, excreted through perihepatic drainages