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Case report

PARACENTESIS-INDUCED ABDOMINAL WALL HEMATOMA: CASE REPORT AND REVIEW OF LITERATURE

ХЕМАТОМ НА АБДОМИНАЛЕН ЗИД АСОЦИРАН СО ПАРАЦЕНТЕЗА: ПРИКАЗ НА СЛУЧАЈ И ПРЕГЛЕД НА ЛИТЕРАТУРАТА

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Abstract

Despite the well-known coagulopathy-associated complications, paracentesis is considered a relatively safe procedure when performed inpatients with liver cirrhosis. We present a case of a large abdominal wall hematoma after paracentesisin a 72-years-old male with decompensated cirrhosis, portal hypertension, refractory ascites and moderately prolonged prothrombin time. Several hours after therapeutic paracentesis wasperformed at the usual point, in the left lower abdominal quadrant, the patient was admitted with severe abdominal pain, circulatory instability and significant blood loss. Ultrasound of the abdominal wall revealed a 10 cm intramural hematoma at the puncture site.In addition to the usual resuscitative measures, the patient required fresh frozen plasma and five units of cryoprecipitate for definitive stabilization. Paracentesis-associated abdominal wall hematoma is a potentially serious, life-threatening complication requiring invasive therapeutic intervention in most cases. In some caseshowever the conservative treatment with cryoprecipitate and fresh frozen plasma can also be quite effective.

Keywords: hematoma, paracentesis, bleeding complications, liver cirrhosis

Апстракт

И покрај добро познатите компликации асицорани со коагулопатијата, парацентезата се смета за релативно безбедна процедура кога се изведува кај пациенти со црнодробна цироза. Презентираме случај на голем хематом на стомачниот зид после парацентеза кај пациент на возраст од 72 години со декомпензирана цироза, портална хипертензија, реф рактерен асцит и умерено пролонгирано протромбинско време. Неколку часа по парацентезата реализирана на вообичаената точка, во долно левиот абдоминален квадрант, пациентот беше хоспитализиран со силна абдоминална болка, циркулаторна нестабилност и значителен губиток на крв. На местото на парацентезата ултрасонографски се утврди присуство на хематом со големина од 10 цм. Освен со примена на вообичаените ресусцитациски мерки, пациентот беше дефинитвно стабилизиран по администрација на свежо смрзната плазма и пет единици криопреципитат. Хематомот на абдоминален зид асоциран со парацентеза е потенцијалносериозна животозагрозувачка компликација за која во повеќето случаи потребна е инвазивна терапевтска интервенција. Сепак, кај некои пациенти конзервативниот третман со криопреципитат и свежо смрзната плазма може да биде прилично ефикасен.

Клучни зборови: хематом, парацентеза, крваречки компликации, црнодробна цироза

Introduction

Liver cirrhosis is accompanied by many abnormalities in primary hemostasis, coagulation and fibrinolysis [1]. For this reason, clinicians have historically been concerned about an increased bleeding risk during invasive procedures in patients with cirrhosis.However, recent data suggest that liver cirrhosis actually creates prothrombotic state [2]. In these patients there is an unstable balance between prothrombotic and antithrombotic processes that routine coagulation tests do not properly show [3-6]. Large volume paracentesis (LVP) is rarely associated with clinicallysignificant bleeding and other procedure-related complications and is considered a relatively safe procedure [7-10]. The incidence of fatal bleeding is approximately 0.2% per procedure, and the incidence of mortality due to bleeding complication is lower than 0.01% [11]. Paracentesis-related bleeding complications (PRBC) are more prevalent after

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therapeutic vs. diagnostic LVP [9], in patients with high CTP and MELD scores [9,13], in renal dysfunction [7,12], in acute-on-chronic liver failure (ACLF) [13] and in patients with low fibrinogen level [13]. More importantly, PRBC are not related to elevated international normalized ratio (INR)[9,12], low platelet count [12] or operator's experience [12]. There are three types of PRBC described in the literature: abdominal wall hematoma, pseudoaneurysm, and hemoperitoneum. Although they are all rare, according to one systematic review abdominal wall hematomas occur mostfrequently [7]. While the bleeding may be due to direct puncture of a superficial abdominal wall vein or a mesenteric varix, in most cases the bleeding originates from a lesion of the inferior epigastric artery or one of its tributaries [7,9]. Most PRBC are minor and can be successfully controlledwithsupportive medical measures such as fluid resuscitation, blood transfusion and correction of the coagulation disorders [12]. Occasionally, severe, life-threatening bleeding can occur and an interventional procedure is oftenrequired in order to control the bleeding.

Case report

We present a case of 73-year-old male withlong-term alcohol consumption and recently diagnosed decompensated liver cirrhosis, admitted to our department after variceal bleeding. Transabdominal ultrasound revealed findings typical for advanced liver disease, aslightly enlarged spleen and alarge amount of ascites. Gastroscopy showed grade III esophageal varices. We performed band ligation of the esophageal varices and after stabilization the patient was discharged on anon-selective beta blocker, lactulose and dual diuretic therapy. In the follow-up period, we noticed his ascites to be diuretic resistant and proceeded to perform uncomplicated large volume paracentesis (LVP).

Several weeks later the patient returned for a second LVP. Before the intervention we performed bothclinical and ultrasound examinations, complete blood count and complete biochemical panel. The results revealed no significant changes in the lab results. The CTP score was 12, MELD score 19, INR 1.7 and the platelet count was $176x10^3$/µl (Table 1). We performed the intervention at the usual site, the lower left abdominal quadrant and we evacuated 5 liters of yellow fluid. The patient felt well and was discharged several hours later. Later that day, the patient returned to our department complaining of severe lower abdominal pain and weakness. Examination revealed hypotension and tachycardia and CBC showed a significant decline in Hgb from its baseline. Ultrasonographic examination of the abdominal wall revealed 10 cm hematoma within the abdominal wall at the puncture site (Figure 1A). During the hospitalization the patient was closelymonitored and treated with supportive measures includingcrystalloid and colloid fluids and fresh frozen plasma. Despite this,he remained hemodynamically unstable and his blood count continued to decline despite multiple blood transfusions. The patient's hemodynamic instability precluded obtaining a dynamic CT scan. Taking into account the worseningclinical course and the limited therapeutic options, we decided to administer five units of cryoprecipitate. After the infusion,striking clinical improvement and definitive stabilization occurred. Shortly after, the patient was safely discharged from the hospital.The hematoma size was markedly reduced at follow-up examination several weeks later (Figure 1B).

Table 1. Complete blood count and biochemical blood analysisduring the hospitalization

DAY	0 Before LVP	0 After LVP	1	2	3	4	5	6	7
HGB (g/dL)	89.00	69	72	58	66	78	99		99
HGB (g/dL)	89.00	69	72	58	66	78	99		99
RBC ($x10^6$ /µl)	2.20	1.83	1.73	1.7	1.98	2.36	2.95		2.89
HCT (%)	25.3	20.9	18.5	17.5	20.2	24	29.5		29.5
PLT ($x10^3$/µl)	176	187	145	92	94	93	112		122
BUN (mmol/l)	12.1	13.7					14.2		11.7
Cr (µmol/l)	88.3	90					94.6		82.6
PT (sec)	18.90								14.1
INR	1.7								1.29
bilirubin (µmol/l)	146								137.9
albumin (g/l)	25								27
Na (mmol/l)	133								134
K (mmol/l)	4.9								3.8
AST (U/L)	117								90
ALT (U/L)	63								49
AP (U/L)	188								168
GGT (U/L)	129								128

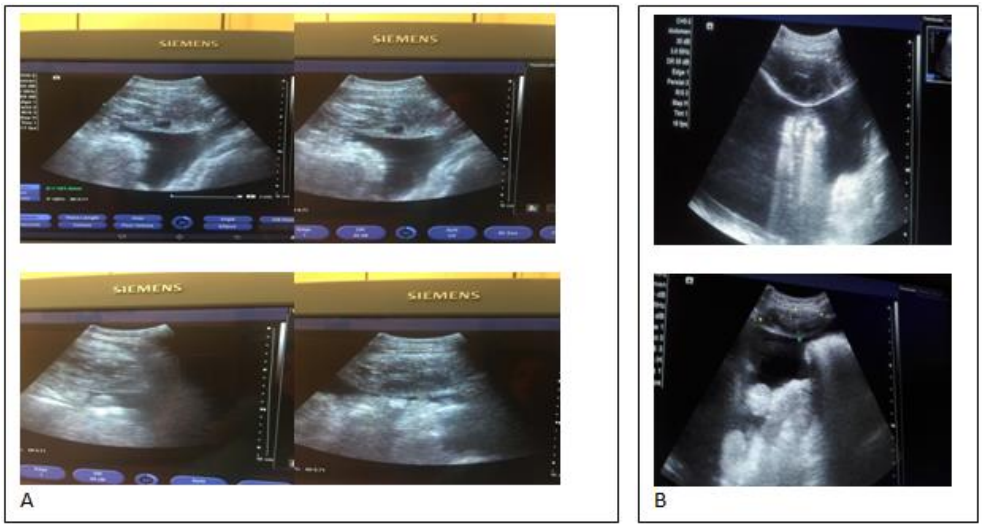

Fig. 1. Ultrasound images of the post-puncture intramural hematoma; A: The ultrasound examination at presentation revealed aclearly visible 10 cm large nonhomogeneous oval formation within the abdominal wall highly suggestive of intramural hematoma. B: six weeks later we registered a significant reduction of the hematoma size

Discussion

Many cirrhosis-associated complicationsare actually a consequence of the complex acquired coagulation disorder that developsin these patients. Previously this condition was mainly thought to involve anticoagulation reflected as an elevated INR. More recent data show disturbances in the concentration ofboth, procoagulants and anticoagulant factors [6]. Compared to healthy subjects, cirrhotic patients have reduced levels of antithrombin, protein C, factor V and factor II, and significant increase of factor VIII [6,14]. The markedincrease of the powerful procoagulant factor VIII and the significantdecrease of the naturally occurring anticoagulant factor protein C, seem to be the most typical coagulation abnormalities in cirrhotic patients [6]. Based on the coagulation tests abnormalities [prolonged prothrombin time (PT), activated partial thromboplastin time (aPTT) and bleeding time (BT), low platelet count] the bleeding complications in cirrhotic patients have been attributed to the presence of coagulopathy and/or thrombocytopenia. Therefore, liver cirrhosis has beenthought to confer an increased bleeding risk. However, there are studies showing that plasma from cirrhotic patients actually generates normal amounts of thrombin [5]. Data obtained in the last two decades have provided substantial evidence strongly suggesting that liver cirrhosis is predominately associated with hypercoagulable state and an increased tendency for thrombotic events compared to healthy controls [2,6]. Also, the increase of the powerful procoagulant Von Willebrand factor is at least partially able to compensate for the disturbance in primary hemostasis due to thrombocytopenia and thrombocytopathy [4,5,14].

The presented case highlights several important issues. Thepatient's prior therapeutic paracentesis went well, without any bleeding complications. Moreover, he had no history of complications related to coagulopathy. Lab analysis on the day of the paracentesis including complete blood count and routine coagulation tests were not indicative of an increased bleeding risk. Nonetheless, the patient had advanced liver disease and significant, potentially life-threatening bleeding that was only successfully controlled with fresh frozen plasma and five units of cryoprecipitate. This indicates that in patients with liver cirrhosis there are probably numerous subtle abnormalities in the haemostatic systemthat routine tests of coagulation do not capture. Also, these tests are not able to point out to an increased bleeding risk in the way they do in the general population. Moreover, the complex interaction between pro- and anticoagulant factor and also the mutual compensation between different abnormalitis in cirrhotic patients further complicates the assessment of bleeding risk

Despite the well-established haemostaticabnormalities in patients with liver cirrhosis, the relevant literature suggests that the bleeding complications that occasionally occur in such patients are not always due to derangement in the coagulation process [12]. Most studies have indicatedthat the prolonged PT and elevated INR were not related to increased risk for bleeding complication [9,12,13]. For example, Lin *et al.* showed that severe hemorrhagic complications more frequently occur in patients with ACLF [13]. Also, most of the patients included in one systematic review that analyzed PRBC (90% had liver cirrhosis) confirmed some form of renal function impairment in 70% of patients [7]. This means that the hemorrhagic complications that occur in advanced liver disease could be more closely related to some liver disease-associated complications and acute events than to a distinct form of acquired coagulation disorder resulting from the liver dysfunction.

Hemodynamic alterations related to portal hypertension, bacterial infections, endothelial dysfunction or renal failure may all potentiallyplay a certain role in determining the bleeding risk in these patients [3,5,7].

Conclusion

Despite increasing awareness that chronic liver disease is not an anticoagulated state [1,14], invasive procedures in cirrhotic patients may in a selected population be associated withsignificant, often life-threatening bleeding complications. Paracentesis-associated bleeding is a rare, but serious complication requiring an invasive therapeutic intervention in most cases. However, in some cases the conservative treatment with cryoprecipitate and fresh frozen plasma can also be quite effective.

Conflict of interest statement. None declared.

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