Massive Hemorrhage from Spontaneous Ruptured Hepatocellular Carcinoma Controlled by Isoamyl 2-Cyanoacrylate: A Case Report

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Key Words

Ruptured hepatocellular carcinoma • Massive hemoperitoneum • Isoamyl 2-cyanoacrylate

Abstract

Objective: To report a case of ruptured hepatocellular carcinoma with massive hemoperitoneum which was successfully controlled with isoamyl 2-cyanoacrylate. **Clinical Presentation and Intervention:** A 46-year-old Bangladeshi gentleman presented to our casualty complaining of acute abdominal pain and distension, associated with jaundice. Bedside abdominal ultrasound showed multiple focal lesions in the liver with fluid in the abdomen. The patient was vitally unstable, so he was resuscitated and underwent emergency laparotomy for massive hemoperitoneum due to a ruptured tumor nodule. Isoamyl 2-cyanoacrylate was applied to the ruptured nodule which stopped bleeding within 1–2 min. **Conclusion:** This case shows the effectiveness of isoamyl 2-cyanoacrylate in controlling bleeding in ruptured liver tumors.

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Introduction

Worldwide, hepatocellular carcinoma (HCC) is becoming the fifth common cancer and the third leading cause of cancer mortality [1, 2]. There are many risk factors that may lead to HCC development. Recently recorded risk factors include: nonspecific cirrhosis, alcohol-induced liver disease, hepatitis C and B infection. In normal liver parenchyma, HCC does rarely develop. The patient with HCC may present with sudden onset of abdominal pain, pyrexia of unknown origin, weightloss, malaise, hepatomegaly or hepatic rupture and shock [3, 4]. Thirty-day mortality of patients is significantly affected by presentation of shock, hemoglobin levels, serum total bilirubin level and previous diagnosis of HCC [5, 6].

Although ruptured HCC occurs in about 3–15% of HCC patients, it carries a high mortality rate (25–75%) [2]. The exact mechanism of this spontaneous rupture remains unclear. However, there are many theories suggesting that it is due to either rapid growth of the tumor itself with necrosis, coagulopathy or rapid expansion because of bleeding within the tumor [2]. Management of ruptured HCC is still a challenge to surgeons despite ad-

vances in surgical technology. The main aim in the management of this acute condition is to control bleeding and maintain good hemostasis. We present a case of hemoperitoneum due to ruptured HCC, which was controlled by the application of isoamyl 2-cyanoacrylate.

Case Report

A 46-year-old Bangladeshi gentleman known to have diabetes mellitus and hypertension, presented to our hospital casualty in January 2010 complaining of sudden diffuse abdominal pain and distension over 3 days. These were associated with nausea, vomiting and jaundice. The patient had experienced a marked loss of weight over the last 3 months. He was a smoker and consumed alcohol. He denied any history of hematemesis, and had no history of any other illness.

On examination, the patient was vitally stable, deeply jaundiced, pale and slightly disoriented. His abdomen was distended with mild guarding in the left upper quadrant, and a shifting dullness test was positive. Digital rectal examination revealed a stool of a normal color. Laboratory investigations showed that the patient had elevated liver enzymes (alanine and aspartate aminotransferases) with hemoglobin level 10.3 g/dl. His albumin was low (30 g/l). Bedside ultrasound of the abdomen showed a cirrhotic liver with multiple focal lesions and fluid in the abdomen.

Two hours later, the patient started to become unstable. He was resuscitated with blood products (packed RBCs – cryoprecipitate – fresh frozen plasma). A CT scan was conducted but the patient was still unstable in spite of aggressive resuscitation. Abdominal paracentesis confirmed the presence of hemoperitoneum. Emergency exploratory laparotomy revealed hemoperitoneum and multiple lesions involving both liver lobes. There was one round ulcerated area of about 2 × 2 cm located in segment V which was actively bleeding, and the liver was grossly cirrhotic. Because the tumor tissue was very friable, we preferred to use isoamyl 2-cyanoacrylate (Amcrylate®, Concord Drugs Ltd., Hyderabad, Andhra Pradesh, India) instead of suturing the site of bleeding. The bleeding stopped within 1–2 min after application of this material. Exploratory surgery of the abdomen showed no other intra-abdominal masses. The abdomen was closed after ensuring that there was no other site of bleeding and complete hemostasis was obtained. The patient had an uneventful postoperative recovery, and 2 weeks later he was discharged.

Discussion

Prevalence of HCC differs from one geographic area to another. HCC constitutes about 2% of all malignancies in the USA [7]. However, the highest incidence of 4–5% has been recorded in Japan [7]. HCC is more common in males than females, with a ratio of up to 8:1 in areas with high incidence [7]. Sixty-two years was reported in an Italian study as an average age for patients with spontaneously ruptured HCC [3]; our patient was 46

years old. A ruptured nodule is one of the fatal complications of HCC. The diagnosis remains difficult, especially for those where previous liver disease is unknown. Ultrasonography, CT, abdominal paracentesis and angiography can be used to diagnose this condition. However, 20–33% of the patients are mainly diagnosed via an emergency exploratory laparotomy, due to acute presentation with shock [2, 3]. In this case, the patient was mainly complaining of sudden acute abdominal pain and distension. Although he was young, his symptoms and examination raised the suspicion of malignancy. This suspicion increased after ultrasonography and the paracentesis findings.

The management of ruptured HCC is achieved by many techniques depending on the stability of the patient. If the patient is hemodynamically stable, conservative treatment with close monitoring and correction of coagulopathy is the cornerstone of the management [8]. On the other hand, if the patient is hemodynamically unstable, as in our case, they may have surgical interventions after resuscitation. These include transarterial embolization, perihepatic packing, suture plication, absolute alcohol injection, hepatic artery ligation or emergency lobe resection.

Surgical interventions depend on the condition of the liver, the size of the tumor and its location. Perihepatic packing is preferred in an oozing tumor located near the diaphragm; however, it should not be left for more than 36–72 h because of its affinity to induce infection [2]. Perihepatic packing was not a good option in our case because of the location of the ruptured liver nodule. Neither was suturing the bleeding site, because the tumor tissue was very friable. Therefore, isoamyl 2-cyanoacrylate was used and showed a very good result. Isoamyl 2-cyanoacrylate is a bioadhesive agent made from advanced gamma-sterilized, nonpigmented, bacteriostatic materials [9]. It acts by forming strong bands via an exothermic reaction in the presence of body fluid or tissue [9]. It closes the wound within 60 s, and although it can be used in many surgeries, it is contraindicated in neurosurgeries.

These cyanoacrylate adhesives were developed in 1949, and first used in surgery in 1959 [10]. Since then, many formulas of cyanoacrylates have been synthesized, like: methyl cyanoacrylate, n-butyl cyanoacrylate, isoamyl 2-cyanoacrylate and α -cyanoacrylate. However, methyl cyanoacrylate has not been used much, due to its tissue toxicity, while others show good biocompatibility and are considered nontoxic materials [9, 10]. n-Butyl cyanoacrylate is currently used in many surgical procedures, for

example in caliceal fistulas, nephrotomies, arteriovenous fistulas and injection of bleeding varices [11]. Unfortunately, there is no published study showing significant differences between these cyanoacrylates. More studies and clinical trials should therefore be carried out to test the effects of the various cyanoacrylates.

Conclusion

The application of isoamyl 2-cyanoacrylate on this ruptured tumor tissue was effective in controlling the bleeding from the friable tissue and should be one of a surgeon's armamentarium in difficult cases.

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