Subcapsular hepatic hematoma with right hepatic vein thrombosis: a complication of shock wave lithotripsy

Jennifer Gordetsky, MD;[*] Sean Hislop, MD;[†] Mark Orloff, MD;[†] Melanie Butler, MD;[*] Erdal Erturk, MD[*]

Abstract

Extracorporeal shock wave lithotripsy (ESWL) is a well-established, safe and effective therapeutic modality for surgical treatment of urolithiasis. Hematoma is a rare complication of ESWL and, when it occurs, typically involves the kidney. We report the case of a 71-year-old woman who developed severe, persistent abdominal pain after ESWL for a 9-mm stone at the ureteropelvic junction. Post-treatment CT scan demonstrated a 13 × 6–cm subcapsular hepatic hematoma. A follow-up CT scan showed expansion of the hematoma and development of hepatic vein thrombosis. This finding, along with persistent abdominal pain and rising liver transaminases, led to surgical intervention. The patient's symptoms resolved and liver function returned to baseline following liver decompression.

CUAJ 2008;2(1):61-3

Introduction

Extracorporeal shock wave lithotripsy (ESWL) continues to be the most frequent treatment modality of urolithiasis and is among the most common urological procedures performed in the United States. It has been proven safe and effective, and serious complications are rare. The literature reports that subcapsular and perirenal hematomas may occur in as many as 15%–26% of cases.[1,2] However, most of these are subclinical and only identified on routine imaging after treatment.[1,2] The incidence of clinically significant hematoma formation after ESWL is reported in less than 1% of cases in the literature.[3–5] Hepatic hematoma after ESWL has only been described 4 other times in the literature and all of these cases were managed conservatively.[6–9] We report the first case of subcapsular hepatic hematoma with development of hepatic vein thrombosis after ESWL and describe a minimally invasive surgical approach to treating this complication.

Case Report

A 71-year-old woman presented with right flank pain and was found, on CT scan, to have a 9-mm stone at the right ureteropelvic junction. A radiopaque density consistent with a stone at this location was confirmed by kidney, ureter and bladder radiography. A fenestrated, double J stent was placed and the patient underwent ESWL using the Dornier Doli 120 model lithotripter (Dornier MedTech,1977, Marietta, Georgia). General endotracheal tube anesthesia was used during the procedure. A total of 2500 shocks were delivered at a maximum power of 18 kV and a rate of less than 90 shocks per minute. The patient's past medical history was significant for chronic obstructive pulmonary disease, peptic ulcer disease and diverticulitis. She had undergone multiple surgeries in the past, including an appendectomy, oophorectomy and left breast lumpectomy, with no reported coagulopathy. Following the procedure, the patient complained of acute chest and right shoulder pain. A myocardial infarction was considered and an electrocardiogram, a creatine kinase muscle–brain isoenzyme (CK_2 [MB]) level and serial troponins were obtained, all of which were negative. The patient remained hemodynamically stable but continued to have severe and persistent right side abdominal pain with right upper quadrant tenderness to palpation. This finding led us to obtain a CT scan of her abdomen and pelvis. The CT scan showed a 13 × 6–cm subcapsular hematoma of the liver, compressing the right lobe (Fig. 1). The patient was managed conservatively with observation and serial hematocrits. Over the 48 hours that followed, the patient's hematocrit dropped from 0.40 to 0.26, transaminases and her total bilirubin rose; the patient continued to have persistent abdominal pain. The patient's aspartate aminotransferase and alanine aminotransferase reached a peak of 493 U/L and 750 U/L, respectively. Her total bilirubin rose to 37.62 μmol/L. A repeat CT scan at 48 hours showed expansion of the hematoma with compression of the intrahepatic vessels and newly visualized thrombus within the right hepatic vein leading into the inferior vena cava (Fig. 2). The patient was evaluated by the liver surgery team and she consented to a laparoscopic evacuation of the hematoma. A hand-assisted laparoscopic approach was used, with a 12-mm umbilical camera port, a 5-mm right upper quadrant working

port and a 7-cm right subcostal incision for the hand port. Initial evaluation of the abdomen revealed a significant number of adhesions from the capsule of the liver to the abdominal side wall. We believe that tearing of these adhesions during ESWL caused the subcapsular hematoma. A capsulotomy was made using a suction irrigator under the guidance of hand control and 900 mL of liquid hematoma was evacuated. The rest of the hematoma was evacuated with blunt extension of the capsular incision. Although no active bleeding was seen, argon beam coagulation was used on the surface of the liver to ensure hemostasis. A postoperative CT scan showed marked improvement of the subcapsular hepatic hematoma, with improved hepatic vein filling (Fig. 3). A small amount of residual thrombus was visualized in the right hepatic vein. Following liver decompression, the patient's serial transaminases and total bilirubin trended toward normal and her hematocrit remained stable. The patient reported resolution of her abdominal pain.

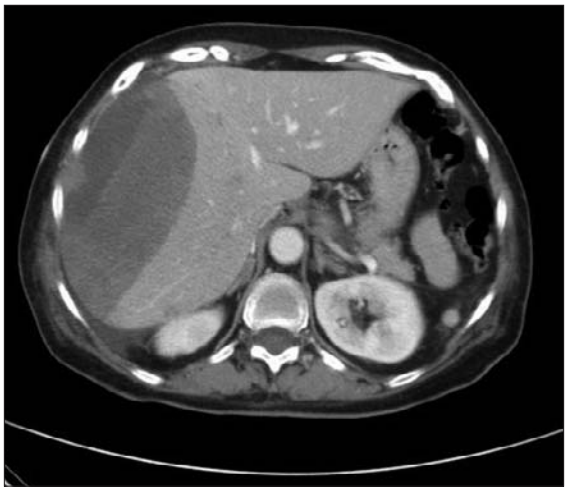

Fig. 1. CT scan following shock wave lithotripsy showing a 13 × 6–cm subcapsular hepatic hematoma.

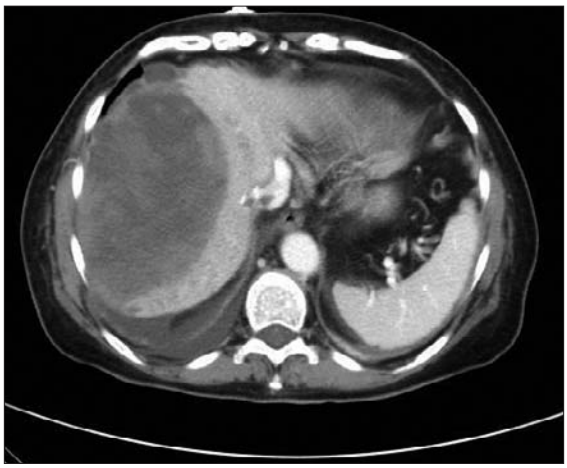

Fig. 2. Repeat CT scan at 48 hours showing a subcapsular hepatic hematoma with right hepatic vein thrombosis leading into the inferior vena cava.

Commentary

Subcapsular hepatic hematoma is a rare complication of ESWL. Only 4 cases have been reported in the literature, and to our knowledge, no cases that resulted in hepatic vein thrombosis have been reported.[6–9] Moreover, no cases, to our knowledge, have been described in the third generation lithotripters. All of the reported cases were managed either with percutaneous drainage or watchful waiting.[6–9] Our decision for surgical intervention was influenced by the patient's persistent pain, expansion of the hematoma, worsening liver function and hepatic vein thrombosis. A hand-assisted laparoscopic approach was successful in decompression of the hepatic hematoma with subsequent resolution of elevated transaminases, total bilirubin and pain. Hypertension, age, coagulopathy and use of anticoagulant medication have been identified as independent risk factors for the development of perinephric or subcapsular renal hematomas following ESWL.[3,10,11] Our patient did not have a pre-existing history of hypertension or known liver pathology or coagulopathy. She denied any use of anticoagulant medications. The

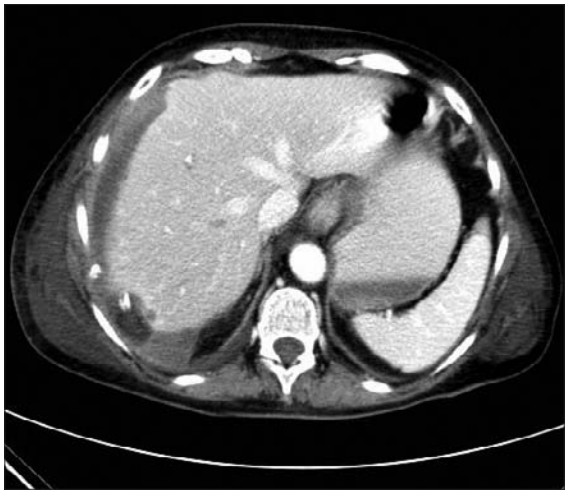

Fig. 3. CT scan showing decompression of the liver after laparosopic hepatic capsulotomy.

hepatic adhesions noted at the time of surgery were thought to be responsible for a capsular tear during ESWL, leading to the formation of a hematoma.

Subcapsular hepatic hematoma is a rare complication following ESWL, and this is the only reported case involving hepatic vein thrombosis. A CT scan of the abdomen to rule out hemorrhage is recommended when persistent unexplained pain occurs following ESWL. In most cases, conservative management, including watchful waiting or percutaneous drainage of the collection, can be used.[6–9] However, more complicated cases that affect liver function may require surgical intervention.

From the Departments of *Urology and †Transplant Surgery, University of Rochester School of Medicine, Rochester, NY

This article has been peer reviewed.

Competing interests: None declared.

References

1. Rubin JI, Arger PH, Pollack HM, et al. Kidney changes after extracorporeal shock wave lithotripsy: CT evaluation. *Radiology* 1987;162:21-4.
2. Baumgartner BR, Dickey KW, Ambrose SS, et al. Kidney changes after extracorporeal shock wave lithotripsy: appearance on MR imaging. *Radiology* 1987;163:531-4.
3. Kostakopoulos A, Stavropoulos NJ, Macrychoritis C, et al. Subcapsular hematoma due to ESWL: risk factors. A study of 4,247 patients. *Urol Int* 1995;55:21-4.
4. White W, Klein F. Five-year clinical experience with the Dornier Delta lithotripter. *Urology* 2006;68:28-32.
5. Sherman SC, Dogon A. Subcapsular renal hematoma after shock wave lithotripsy. *J Emerg Med* 2006;30:437-9.
6. Kobayashi K, Ishizuka E, Iwasaki A, et al. Subcapsular hematoma of the liver after extracorporeal shock wave lithotripsy. *Nippon Hinyokika Gakkai Zasshi* 1998;89:445-8.
7. Padilla Valverde D, Ladron C, Ramia Angel JM, et al. Symptomatic subcapsular hepatic hematoma after renal extracorporeal shock wave lithotripsy. *Actas Urol Esp* 2001;25:774-6.
8. Meyer JJ, Cass AS. Subcapsular hematoma of the liver after renal extracorporeal shock wave lithotripsy. *J Urol* 1995;154:516-7.
9. Neto AC, da Silva MN, Mattos MH, et al. Infected hepatic hematoma after renal extracorporeal shock wave lithotripsy. *Clinics* 2006;61:275-6.
10. Dhar NB. Thornton J. Karafa MT. Streem SB. A multivariate analysis of risk factors associated with subcapsular hematoma formation following electromagnetic shock wave lithotripsy. *J Urol* 2004;172:2271-4.
11. Collado Serra A, Huguet Perez J, Monreal Garcia de Vicuna F, et al. Renal hematoma as a complication of extracorporeal shock wave lithotripsy. *Scand J Urol Nephrol* 1999;33:171-5.

Correspondence: Dr. Jennifer B. Gordetsky, Department of Urology, University of Rochester School of Medicine, 601 Elmwood Ave., Box 656, Rochester NY 14642; Jennifer_Gordetsky@urmc.rochester.edu