

# Minor Fall Leading to Fatal Rupture of Solitary Giant Sub-Capsular Cavernous Haemangioma of Liver: a Case Report

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## ABSTRACT

**Background:** The liver which is a vascular organ can easily be lacerated or crushed, depending on the severity of trauma.

**Case Report:** A 55 year-old lady who fell down was taken to a hospital within one hour and died two hours post-trauma. An autopsy revealed rupture a large sub capsular vascular lesion situated on the right lobe of liver with hemoperitoneum. There was a deep contusion on the abdominal wall adjacent to the costal margin on the right side, roughly overlying the rupture, but the skin showed no evidence of injury on external examination. Histopathology revealed that the lesion was a giant cavernous haemangioma of the liver which was undetected prior to the incident.

**Conclusion:** Certain conditions like fatty liver disease, polycystic disease and cavernous haemangioma can predispose liver injury, even with considerably less amount of force than is ordinarily required.

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► *Implication for health policy/practice/research/medical education:* Fatal Rupture of Solitary Giant Sub-Capsular Cavernous Haemangioma of Liver

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## 1. Introduction:

The liver which is a vascular organ can easily be lacerated or crushed, depending on the severity of trauma. The large size as well as the location makes it more susceptible than other abdominal viscera. The liver is the most common solid abdominal organ injured in trauma (1, 2). In cases of falls from height, it has been observed that the critical

height above which liver injury occurs is 15 meters (3). Falling down on level ground does not ordinarily lead to laceration of liver. Certain liver diseases such as fatty liver disease, hepatitis (3) and polycystic disease of liver (3) can increase the probability of life-threatening injury, even with minimal force. A lesion made up of large blood filled vessels such as a cavernous haemangioma would be more susceptible to injury than the structure of the normal liver.

In this article, we are presenting a case of an asymptomatic sub capsular giant cavernous haemangioma (GCH) of the liver which

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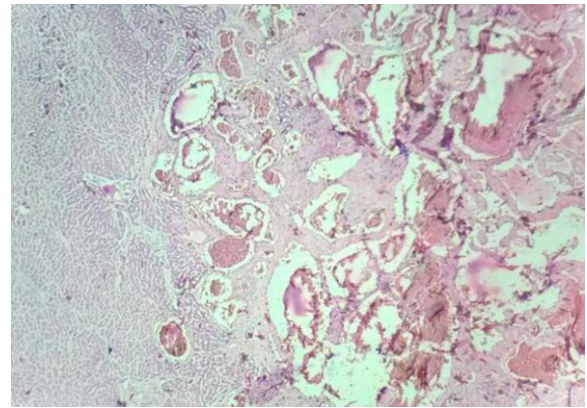
ruptured resulting in severe intra peritoneal haemorrhage and death.

## 2. Case Report:

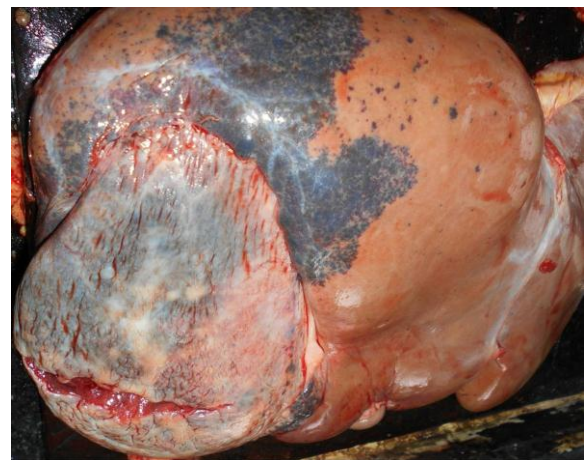
A 55 year-old lady had tripped and fallen down on level asphalt. The incident was witnessed by passersby according to whom she was conscious at the time of the fall (17.30 hours) and had tried to arrest the fall with her right upper limb. She was taken to a nearby hospital by 18.00 hours. The lady was breathless, disoriented, sweating and was complaining of pain in the chest when first attended to. Electrocardiogram was not remarkable. Her blood pressure was 130/56mmHg, pulse rate was 110/minute, and SPO<sub>2</sub> was 99% at the time of admission. The blood pressure rapidly dropped and was not recordable by 19.15 hours; SPO<sub>2</sub> became 80%. She stopped responding to call while in the emergency room. Death was declared at 19.45 hours (2 hours 15 minutes post trauma) after attempted cardiopulmonary resuscitation (CPR). Blunt abdominal trauma was not suspected by the attending doctor.

Her past medical history was not remarkable. Information about nonspecific symptoms such as abdominal discomfort; pain in the abdomen, back or shoulder; feeling of fullness; a sensation of mass in the abdomen or abdominal dissention; early satiety; nausea and vomiting which are encountered in cavernous haemangioma (5, 6) was not available.

A forensic autopsy was conducted the next day. The only injury noted on external examination was an abraded contusion measuring 0.5×0.5×0.3 cm<sup>3</sup> on the back of the right elbow. On dissection, an oblique contusion measuring 7×3×3 cm<sup>3</sup>, involving the full thickness of the abdominal wall, placed just below the costal margin and 10cm to the right of the midline was noted. There was no external injury corresponding to this contusion. The liver weighed 1800 grams and its border was seen to extend below the coastal margin. The right lobe of the liver had a sub-capsular vascular lesion measuring 19.5×10×8 cm with a distinct dark wrinkled surface. On section, it could be easily distinguished from the adjacent liver tissue. Microscopically, the vascular



**Fig. 1.** Microscopic picture showing normal liver tissue to the left and vascular channels of varying size lined with flattened endothelial cells to the right. 40X.



**Fig. 2.** The giant cavernous haemangioma and the transcapsular laceration.

lesion showed cystic spaces and areas of autolysis and was identified as a cavernous haemangioma (Figure 1). It was a 'giant' by any definition since its size exceeded 10cm (7). The adjacent liver tissue showed normal histology.

An oblique trans-capsular laceration measuring 8×1×1 cm<sup>3</sup> was seen on the surface of the GCH, placed at right angle to the costal margin. The injury did not extend outside the boundary of the cavernous haemangioma (Figure 2). The laceration was placed almost at right angles to the costal margin. There was 1980 grams of blood in the peritoneal cavity. No other haemangiomas including cutaneous haemangiomas were noted on autopsy examination. Toxicological analysis did not show the presence of any poisonous substances.

### 3. Discussion:

In this case, the abdominal wall contusion and the liver laceration were assessed to be due to blunt injury caused by tripping and falling on to the hard asphalt surface. The abraded contusion on the back of the right elbow was consistent with the fall as described by the eye witnesses.

In cases of trauma, the attending physician may miss early signs of intra abdominal injury, especially if there are no superficial injuries. A life saving surgery may be delayed in such a scenario. The abdominal wall which is lax and compressible transmits blunt force to the abdominal viscera, without sustaining external injuries like abrasions or contusions. The absence of external injury does not exclude the possibility of internal injury which may be severe (2). Pain is a symptom common to intratumoral thrombosis, tumor inflammation, tumor haemorrhage or rupture (3). If the trauma sustained is a trivial one such as a fall on level ground as in this case, the possibility of the injury not being detected is very high.

Cavernous haemangiomas are a type of non-malignant liver tumour (8) and is the most common benign tumour of the liver (8). These occur more often in women (5, 9) and there is anecdotal evidence of the female hormonal milieu being responsible for the sex difference (6). The reported prevalence range varies from 1.4% (9) to 20% (8) in the general population. The mortality among reported cases with ruptured GCH is as high as 78% (10). Even though solitary lesions are commonly encountered, multiple lesions occur rarely (5, 6).

Liver lacerations are known to occur rarely during cardiopulmonary resuscitation. One study showed that 0.6% of CPR attempts out of 2558 resulted in major liver injury (11). Since CPR was attempted in the present case, the authors considered the possibility that it had caused the liver laceration. The blood pressure of the deceased was not recordable by the time CPR started and it was not possible to revive her, therefore, the considerable amount of blood in the peritoneal cavity strongly indicates that the injury was not caused by CPR.

In the present case, as can be judged from the contusion on the abdominal wall, the trauma was sustained in the right upper quadrant of the abdomen and was localized. Such a deceleration injury (12), if sufficiently large, is likely to cause an isolated laceration of liver. It was the right lobe of liver which was injured in the present case which is five times more likely to be injured than the left lobe. There is a significant association between blunt trauma causing rib fractures and liver injuries (13) but no fractures were observed in the present case. In a study published in 1966, it was seen that the capsule of liver is breached when the energy transferred is of the range 27-34 ft-lb (36.6 Nm to 46 Nm) (14). A cavernous haemangioma can be lacerated when the energy transferred is much less than what is required to injure a normal liver.

It is possible for a liver haemangioma to rupture spontaneously. A review article found 0.52% chance of spontaneous rupture (7). Traumatic or iatrogenic rupture of cavernous haemangioma of the liver is an indication for emergency surgery.

Identification of a CH or a GCH is not an indication for surgery unless other symptoms are present (7). Most of the symptomatic cases in one study were sub capsular lesions and were GCHs (15). In paediatric cases, palpable masses are common. In a review of Japanese cases, the most common symptom, seen in 51% of the cases, was an abdominal mass. Pain and a sense of fullness were next high in frequency (6). In a series, not a single case of spontaneous or traumatic rupture of giant liver haemangiomas was reported in 282 patient years (10). Even prolonged follow-up of small and medium-sized haemangiomas is not routinely needed (9).

### 5. Conclusion:

Trauma such as a fall on level asphalt is unlikely to result in rupture of liver, but some conditions like fatty change of liver, hepatitis, cystic changes and haemangiomas may render the liver vulnerable to such minor trauma. Only early identification will allow the physician to initiate appropriate treatment. It needs to be stressed that

absence of external injuries on the abdomen does not preclude the possibility of internal injuries.

## 6. References:

1. Beckingham IJ, Krige JE. ABC of diseases of liver, pancreas, and biliary system: Liver and pancreatic trauma. *BMJ*. 2001;322:783–5.
2. Di Maio VJ, Di Maio DJ. *Forensic Pathology* 2<sup>nd</sup> Edition CRC Press London 2001.
3. Atanasijevic TC, Savic SN, Nikolic SD, Djoki VM. Frequency and severity of injuries in correlation with the height of fall. *J Forensic Sci*. 2005;50(3):608-12.
4. Tong F, Liang Y, Zhang L, Li W, Chen P, Duan Y, et al. Fatal Liver Cyst Rupture in Polycystic Liver Disease Complicated with Autosomal Dominant Polycystic Kidney Disease: A Case Report, *Forensic Science International* (2016), <http://dx.doi.org/10.1016/j.forsciint.2016.03.045>
5. Lerner SM, Hiatt JR, Salamandra J, Chen PW, Farmer DG, Ghobrial RM, Busuttil RW. Giant cavernous liver hemangiomas: effect of operative approach on outcome *Arch Surg*. 2004;139(8):818-21.
6. Schwartz SI, Husser WC. Cavernous hemangioma of the liver. A single institution report of 16 resections *Ann Surg*. 1987;205(5):456-65
7. Di Carlo I, Koshy R, Al Mudares S, Ardiri A, Bertino G, Toro A. Giant cavernous liver hemangiomas: is it the time to change the size categories? *Hepatobiliary Pancreat Dis Int*. 2016;15(1):21-9.
8. Karhunen PJ. Benign hepatic tumours and tumour like conditions in men. *J Clin Pathol*. 1986;39(2):183-8.
9. Gandolfi L, Leo P, Solmi L, Vitelli E, Verros G, Colecchia A. Natural history of hepatic haemangiomas: clinical and ultrasound study. *Gut*. 1991;32(6):677-80.
10. Gilon D, Slater PE, Benbassat J. Can decision analysis help in the management of giant hemangioma of the liver? *J Clin Gastroenterol*. 1991;13(3):255-8.
11. Meron G, Kurkciyan I, Sterz F, Susani M, Domanovits H, Tobler K, Bohdjalian A, Lagner AN. Cardiopulmonary resuscitation-associated major liver injury. *Resuscitation*. 2007;75(3):445-53.
12. Jin, Wangxun et al. "Mechanisms of Blunt Liver Trauma Patterns: An Analysis of 53 Cases." *Experimental and Therapeutic Medicine*. 2013;5(2):395–8.
13. Subedi N, Yadav BN, Jha S. Liver and Spleen Injuries and Associated Rib Fractures: An Autopsy Study. *J Forensic Res*. 2014;5:240.
14. Mays ET. Bursting injuries of the liver. A complex surgical challenge. *Arch Surg*. 1966; 93(1):92-106.
15. Tait N, Richardson AJ, Muguti G, Little JM. Hepatic cavernous haemangioma: a 10 year review. *Aust N Z J Surg*. 1992;62(7):521-4.