

# Multiple Focused Ruptures of Inferior Vena Cava Developing Due to Blunt Trauma

Umut Payza<sup>1</sup>, Zeynep Karakaya<sup>2</sup>, Fatih Esad Topal<sup>3</sup>

İzmir Katip Çelebi University Atatürk Training and Research Hospital, Department of Emergency Medicine, İzmir, Turkey

Umut Payza, M.D.  
Zeynep Karakaya, Assoc. Prof.  
Fatih Esad Topal, Assoc. Prof.

**Correspondence:**

M.D. Umut Payza  
İzmir Katip Çelebi University Atatürk Training and Research Hospital, Department of Emergency Medicine, İzmir, Turkey  
**Phone:** +90 554 755 46 08  
**E-mail:** umutpayza@hotmail.com

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## ABSTRACT

After/following blunt abdominal trauma, a 65-year-old male patient was admitted to the emergency department with stomach pain. The patient was operated due to possible intra-abdominal vascular injury. Perforation was detected at two different points in the inferior vena cava. The patient died during surgery. The aim of this case report is to remind the need for rapid detection and intervention of trauma patients with vascular injuries.

**Keywords:** Blunt abdominal trauma, perforation, vena cava inferior

## KÜNT TRAVMAYA BAĞLI INFERIOR VENA CAVA'NIN ÇOK ODAKLI RÜPTÜRÜ

### ÖZET

Künt abdominal travma sonrası, mide ağrısı nedeniyle acil servise getirilen 65 yaşında erkek hastanın çok tablosunda olduğu görüldü. Muhtemel batin içi vasküler yaralanma nedeniyle ameliyat edilen hastada, vena cava inferior'da iki farklı noktada perforasyon tespit edildi. Hasta ameliyat sırasında öldü. Bu vaka sunumunda amaç vasküler yaralanması olan travma hastalarının hızlı bir şekilde tespit ve müdahale edilmesinin gerekliliğini hatırlatmaktır.

**Anahtar sözcükler:** Künt abdominal travma, perforasyon, vena cava inferior

Inferior Vena Cava (IVC) injuries are quite deadly injuries even though they are part of the venous system. The majority of these injuries are penetrating injuries and blunt traumas that cause vascular injuries are observed much less. It has a very deadly prognosis if diagnosis cannot be made rapidly. High clinical suspicion is required for diagnosis. The objective was to attract attention to this very rare vascular injury by presenting an infrarenal vena cava rupture case with two focuses in a patient brought in to the emergency in shock and with blunt trauma without any solid organ injury under operative conditions.

## Case report

A 65-year-old male patient was brought in to our clinic due to a non-vehicle traffic accident. He was admitted on the trauma stretcher and with cervical immobilization. The patient was evaluated as having consciousness, disoriented, cooperative with a Glasgow coma score of 13 upon admission. The blood pressure of the patient was measured as 80/60 mmHg and the pulse rate was determined as 125 beats/min. The

patient was faded and cold. Hemorrhagic shock was considered in the patient. Hemorrhagic shock treatment was started while the trauma examinations were ongoing. It was learned that the patient had no known disease, drug use or surgical operation in his medical history. Abrasion and hematoma due to head trauma in the frontal region were determined during the head-neck examination. There was no distinction in the thorax examination and respiration rate was normal. Whereas sensitivity was determined in the pelvic region and the right flank region during the abdominal examination. Rapid sequence intubation (RSI) was applied and the patient was intubated as a result of the mental status change and onset of confusion during the examination. Balanced fluid, balanced blood transfusion and inotropic support treatment were started on the patient. Cardiac arrest developed in a short time after intubation was completed and spontaneous circulation was ensured during the second minute of cardiopulmonary resuscitation (CPR) process. Free fluid was observed in the hepatorenal fossa and the douglas pouch during the focused assessment with sonography in trauma (FAST). The patient was also evaluated during this process by specialists from general surgery, orthopedics, cardiovascular surgery, urology and anesthesia. Computerized brain tomography without contrast and IV contrast abdominal pelvic computerized tomography scan were carried out in the accompaniment of doctors while the treatment was ongoing in order to determine the exact source of the hemorrhagic shock in the patient. It was reported by the radiology specialist as a result of the imaging that there was a wide fracture in the pelvic bones and that there was a hematoma in the retroperitoneal region in addition to hemorrhage in the right ureter upper pole and suspicious injuries in the right renal artery segmental branches. It was reported that no intra-abdominal solid organ damage was observed and that minimal free fluid was observed under the liver and that there were no injury findings in the main vascular structures (Figure 1,2).

The patient was taken into surgery by urologists with suspicion of renal artery injury. The laboratory parameters of the patient upon admission were AST; 382 u/l, ALT; 343u/l, Urea; 19 mg/dl Creatine; 1.41 mg/dl, INR; 1.59 APTT; 44.5 sec PT; 17.6 sec. The hemoglobin value of the patient during admission was 14.9 g/dl whereas the control hemoglobin value was observed as 6.7 g/dl despite the ongoing transfusion processes. Whereas Hct was 49.5% upon admission, it was observed as 22% during control.

No pathology was observed in the solid organ and renal vascular structures during the explorative laparotomy

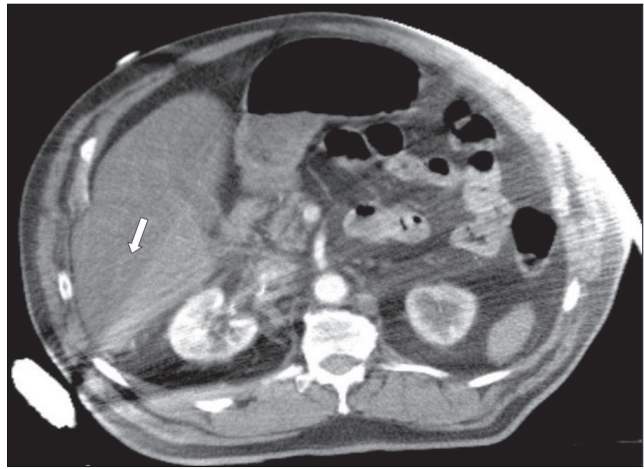


Figure 1.

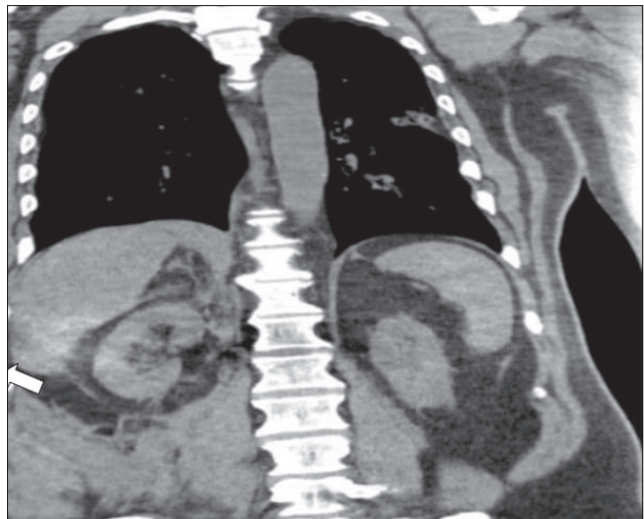


Figure 2.

carried out by urologists. However, bleeding was observed in the renal location posterior part. The Cardiovascular surgery team was also included in the surgery after it was determined during the examination that Inferior Vena Cava (IVC) was ruptured 0.5 cm at the infrarenal level. After the bleeding was repaired, it was observed that the intra-abdominal bleeding continued. A second rupture with a width of about 1 cm was detected and fixed after IVC was scanned upwards. However, cardiac arrest was observed once again in the patient when this procedure was completed. The patient that did not respond to the CPR procedure was accepted as exitus.

## Discussion

Traumas are the most frequent causes of deaths in the world below the age of 45 (1). About 25% of the deaths occur due to bleedings as a result of major vascular

injuries. The vascular injury incidence related to blunt traumas is 1.6% (1,2). The most frequently injured structure in abdominal vascular penetrating injuries is the IVC and its branches and together they comprise about 50% of abdominal penetrating injuries (3). More than 90% of all IVC injuries are penetrating and single-focused injuries (1–3). 90% of these injuries are accompanied by injuries in other solid organs (liver 40–60%, spleen 20–40%, kidneys 10%) (4). Mortality rate reaches up to 70% even in single focus IVC injuries (5). It is very rare that visceral organ damage does not accompany cases for which deadly vein injuries due to blunt traumas have been determined (5,6). Multiple focused injuries in the same vein and IVC injuries at the infrarenal level are much rarer (7). It should not be forgotten that negative peritoneal lavage can be observed in such injuries due to blunt traumas (8,9). Clinical suspicion is the basis for blunt abdominal traumas and diagnosis is tried to be supported via imaging methods despite the fact that they are weak for diagnostic purposes. Diagnosis and access to treatment are relatively possible if the patients are lucky enough to reach the surgical team before death (10–12). Whereas single focus and visceral organ injuries are observed simultaneously in blunt traumas, it is more difficult to determine the localization of the injury (13–15). Since IVC rupture without visceral organ injury in patients under hemorrhagic shock is not one of the

primary diagnoses that clinicians think of, their mortality rates are higher (14,15).

Even though vascular injuries are among the most mortal causes in patients with blunt multi-traumas, the number of studies evaluating the perspective of vascular injuries is very limited (16,17). Vascular injuries in multi-trauma patients due to blunt trauma were examined in a comprehensive study carried out and the distribution of visceral injuries due to blunt traumas was tried to be determined (18). The vascular injury was determined only in 67 cases in a study encompassing 6 years with multi-focused 1033 blunt, multi-trauma patients and vena cava injuries were determined at various levels only in 7 of these patients and only one of these patients has stayed alive. (18)

In conclusion, vascular injuries should come to the minds of clinicians during the early period when hemorrhagic shock develops in patients with blunt abdominopelvic trauma regardless of whether they have visceral organ injuries or not. It should not be forgotten that the Diagnostic Peritoneal Lavage procedure may yield negative results and the need for early vascular surgery should be kept in mind. It should not be neglected in vascular surgery for diagnostic and treatment purposes that injury can be multi-focused.

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