Case Report / Olgu Sunumu

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A Didactic Case Report: FAST Examination Diagnosing Combined Bladder Rupture Following Blunt Abdominal Trauma

Öğretici Bir Olgu: Künt Abdominal Travma Sonrasında FAST Değerlendirilmesiyle Tanı Alan Kombine Mesane Rüptürü

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Abstract

Bedside procedures can be a lifesaver for emergency pediatric trauma patients. The use of ultrasound in emergency pediatric trauma resuscitation may improve patient outcomes. A 15-year-old male patient was brought with the complaint of being stuck between the wall and the support leg of the crane. The patient, who was found to have abrasion and tenderness in the lower abdominal quadrants during emergency trauma examination, was evaluated with a focused assessment with sonography for trauma. The patient was examined with the preliminary diagnosis of bladder rupture. Surgery was planned for the patient, whose diagnosis was confirmed. The use of ultrasound in stable or unstable pediatric abdominal trauma patients can also detect bladder injuries. As a result, it is critical for emergency physicians to improve their ultrasonography abilities.

Keywords: FAST, bladder rupture, emergency medicine, pediatric trauma

Öz

Hasta başı prosedürler acil çocuk travma hastaları için kurtarıcı olabilir. Acil çocuk travma resüsitasyonunda ultrason kullanımı hasta mortalite ve morbiditesini azaltabilir. On beş yaşındaki erkek hasta duvarla vincin destek ayağı arasına sıkışma şikayeti ile getirildi. Acil servis travma bakısında karın alt kadranlarında abrazyon ve hassasiyet saptanan hasta, travmada sonografi ile odaklanmış değerlendirme ile değerlendirildi. Mesane rüptürü ön tanısı ile hastamız ileri incelemeye alındı. Tanısı kesinleştirilen hastaya ameliyat planlandı. Stabil veya anstabil çocuk abdominal travma hastalarında ultrason kullanımı mesane yaralanmalarını da tespit edebilir. Acil servislerde çalışan hekimlerin ultrason farkındalıklarını artırmaları önemlidir.

Anahtar Kelimeler: FAST, mesane rüptürü, acil servis, pediatrik travma

Introduction

Due to their nature, 80% of paediatric abdominal injuries are blunt.[1] Although the most injured organ in these cases is the spleen, bladder injuries are rare compared to others. One of the most feared bladder injuries is rupture. Mortality in adults has been reported as 22%.[2] Choosing the right imaging is important for early diagnosis. Ultrasound is frequently preferred because it can be applied at the bedside, helps rapid diagnosis, is repeatable, cost-effective, and has no radiation. Although the sensitivity of focused assessment with sonography for trauma (FAST) is evaluated between 20-80%, its positivity may accelerate the detection of the patient's pathology.[3]

In this case, a patient diagnosed with combined bladder rupture who was admitted to the emergency department after blunt trauma is presented with FAST images.

Case Report

A 15-year-old male patient presented to the emergency department with the complaint of being stuck between the wall and the support leg of the crane. The conscious patient had no complaints other than lower abdominal pain. He denied any significant past medical history. His vital signs were blood pressure 144/83 mmHg, heart rate 84/min, temperature 36.6 °C, respiratory rate 14/min, and oxygen saturation 99% in room air respectively. His Glasgow Coma score was 15. In

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the physical examination, there were ecchymosis and abrasions on the pelvic region (Figure 1). He described severe abdominal pain. The patient's abdominal visual analogue scale pain score was 9/10. There was no blood at the meatus. The patient's bedside FAST imaging revealed fluid around the bladder, coagulum inside, and irregularity in the lateral wall (Video 1). An indwelling foley catheter was placed, and gross hematuria was noted. Contrast-enhanced abdominal computed tomography (CT) was planned. Intraperitoneal and extraperitoneal bladder rupture was detected in late-phase images (Figure 2). Additionally, minimally displaced, and non-displaced fractures were observed in the left acetabulum, left superior and inferior pubic ramus. There were no clinically significant findings in blood tests. The stable patient was admitted by the pediatric surgeon and an operation plan was created.

Discussion

One of the most frequently used trauma procedures in emergency departments is FAST. It can be defined as searching for free fluid in four quadrants as right upper quadrant, left upper quadrant, subxiphoid region, and pelvis. With the addition of lungs, it is called e-FAST (extended-FAST). As in adults, it is evaluated in the primary survey in pediatric trauma resuscitation. Unfortunately, due to physiological reasons such as the type of pediatric traumas, the small surface area of the patients, and the large size of the organs compared to the body, free fluid in the abdomen can only be detected in 40% of the patients.[4] It may not detect solid organ lacerations, which are the most common pediatric intra-abdominal pathologies. In other words, negativity does not exclude intra-abdominal injury. The fact that it is an operator-dependent process also supports this difficulty. After our patient was evaluated with the classical ABCDE approach, intra-abdominal pathology was suspected and free fluid in the pelvis was detected with point-of-care ultrasound. In addition to the fact that this fluid is adjacent to the bladder, the presence of anechoic irregular shapes in it and the irregularity of the wall borders have increased the possibility of bladder injury.

Figure 1. Ecchymosis and abrasions (suprapubic area)

CT cystogram or X-ray cystogram is used as the standard diagnostic test to evaluate the bladder. Although both modalities have similar sensitivity, studies have shown that CT cystogram is superior because it provides a faster and more accurate diagnosis while requiring less labor.[5] In addition, CT can accurately detect other trauma-related pathologies. Contrast-enhanced abdominal CT was planned for the patient, who was subjected to a load of thousands of kilos between the crane legs and the wall, to detect pathologies other than bladder injury. Early-phase and late-phase (approximately 15 minutes later) images were obtained and evaluated.[6,7] Contrast material leakage from the bladder to the intraperitoneal and extraperitoneal areas was detected in late-phase images. It has been stated in the literature that this method may not be sufficient to exclude bladder perforation by passive distension of the bladder filled with contrast, even if the urinary catheter is clamped.[4] However, it has been stated that it can be used in high-energy traumas, especially in patients who cannot be catheterized.[6] No active bleeding, vascular pathology, or organ injury was detected except for pelvic fractures.

Bladder injuries are most common in children under 6 years of age. Because from this age onwards the bladder is protected by the pubic symphysis.[5] It is associated with 60-90% of pelvic fractures in older age groups. Although there are two types:

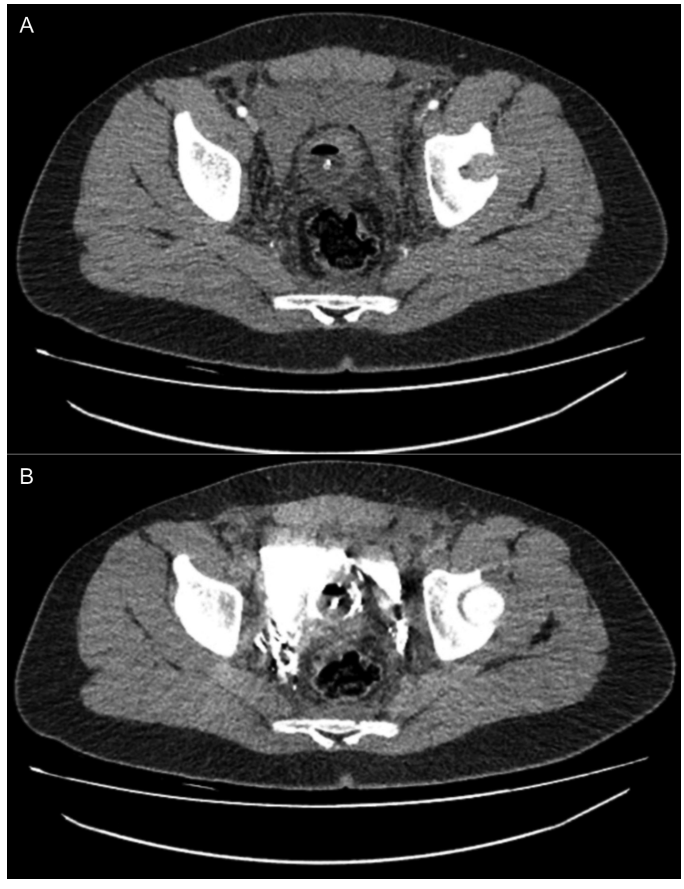

Figure 2. A) Early phase, **B)** Late phase

Extraperitoneal (most common 60%) and intraperitoneal, both conditions can be seen in the same patient in 10% of cases.[8] Pubic ramus fractures generally accompany extraperitoneal injuries. Intraperitoneal injuries often originate from the dome, the weakest area of the bladder. It is reported that a full bladder increases the possibility of injury, but our patient did not have such a description.[5] Extraperitoneal injuries are usually healed with a Foley catheter. Intraperitoneal injuries should be operated.[5,9] Our patient was diagnosed with a combined bladder rupture and underwent surgery. For pelvic fractures, orthopedics recommended bed rest and outpatient follow-up.

Conclusion

Blunt abdominal traumas are challenging cases for physicians. Diseases with high mortality, such as bladder rupture, should be considered in the differential diagnosis. Point-of-care ultrasound may be important for definitive treatment.

Ethics

Informed Consent: The written informed consent of the patient's father was taken.

Financial Disclosure: The author declared that this study received no financial support.

Video 1: https://www.youtube.com/watch?v=wapHNGgVQ-c

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