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Management of intraperitoneal bladder rupture with ultrasound guided percutaneous drainage

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Abstract

Presentation
A 74-year-old female was transferred to our facility with a suspected perforation following TURBT of a high-grade papillary tumour. On arrival the patient agitated with a distended, tender abdomen. Multiple seizures occurred during assessment.

Diagnosis
Serum electrolyte studies revealed the patient to be profoundly hyponatraemic.
Intraperitoneal bladder rupture was confirmed on Computed Tomography (CT) Urogram.

Treatment
Gold Standard management of intraperitoneal bladder rupture consists of open surgical repair. In this case, drainage of abdominal free fluid was instead performed via percutaneous, radiologically guided insertion of a pigtail catheter. Serum sodium was corrected via target lead intravenous infusion.

Discussion
Percutaneous drain insertion is a feasible treatment option in the haemodynamically stable patient with isolated intraperitoneal bladder rupture.

Introduction

Intraperitoneal rupture of the bladder is a rare but significant complication of TURBT with a high degree of associated morbidity and mortality[1]. These patients are also exposed to a significant risk of developing TUR Syndrome , in which electrolyte imbalances occur secondary to absorption of irrigation fluid, secondary to intraperitoneal extravasation of irrigation fluid resulting frequently in electrolyte imbalances[2]. Conventional management of intraperitoneal bladder rupture consists of open surgical repair. We report the case of a 72-year-old woman

diagnosed with an iatrogenic intraperitoneal bladder rupture and subsequent TUR Syndrome which was successfully treated using ultrasound guided percutaneous peritoneal drain insertion and target lead electrolyte correction. Percutaneous drain insertion is a novel, minimally invasive approach which has proven successful in the management of uncomplicated intraperitoneal bladder perforation[3].

Case Report

A 74-year-old female was transferred urgently to our hospital with a suspected bladder perforation and TUR Syndrome following transurethral resection of a high grade superficial papillary bladder tumour (PT1G3). Resection was carried out under spinal analgesia, using monopolar diathermy with 1.5% glycine irrigation.

Serum electrolyte analysis revealed low sodium (Na=110mmol/L, (133-145mmol/L)). Serum osmolality and urine osmolality were measured demonstrating a hypo-osmolar hyponatraemia consistent with suspected TUR Syndrome. Episodes of seizure like activity later ensued. CT Urogram revealed extensive intra-abdominal and pelvic free fluid with locules of gas visualised outside of the bladder consistent with intraperitoneal bladder perforation.

Serum sodium concentration was corrected by administration of hypertonic (3% NaCl) saline. Sodium correction was aimed at an increase of 6mmol/L per day – not to exceed 12mmol/L/day – to mitigate the risk of osmotic demyelination syndrome. Free bladder drainage was carried out catheterisation. Under ultrasound guidance, a *Yueh* needle was advanced into the deepest pocket of the left lower quadrant. Over an *Amplatz* wire, an 8 French pigtail catheter was inserted. Clear, colourless fluid was drained freely.

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Figure 1: CT Urogram, axial section, demonstrating extensive intra-abdominal free fluid with locules of gas outside the bladder consistent with intraperitoneal bladder rupture. Right sided hydronephrosis secondary to right sided posterior bladder wall lesion causing obstruction at the right vesicoureteric junction.

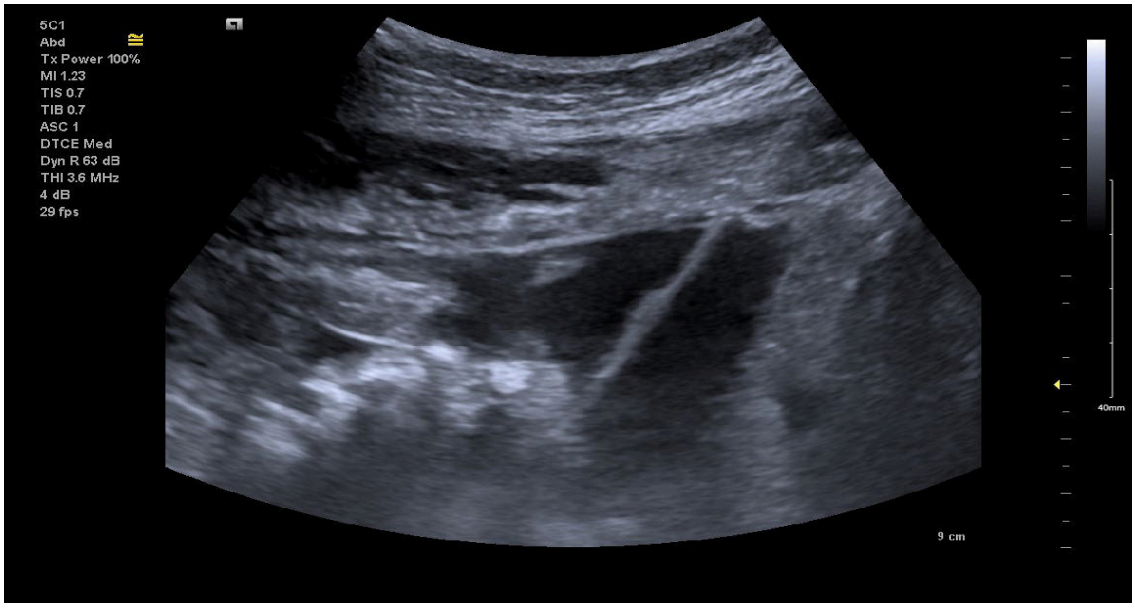

Figure 2: Yeuh needle advanced into the deepest pool of fluid in left lower quadrant.

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Figure 3: Repeat CT Urogram six months post bladder rupture demonstrating interval resolution of rupture with no pelvic free fluid.

Results

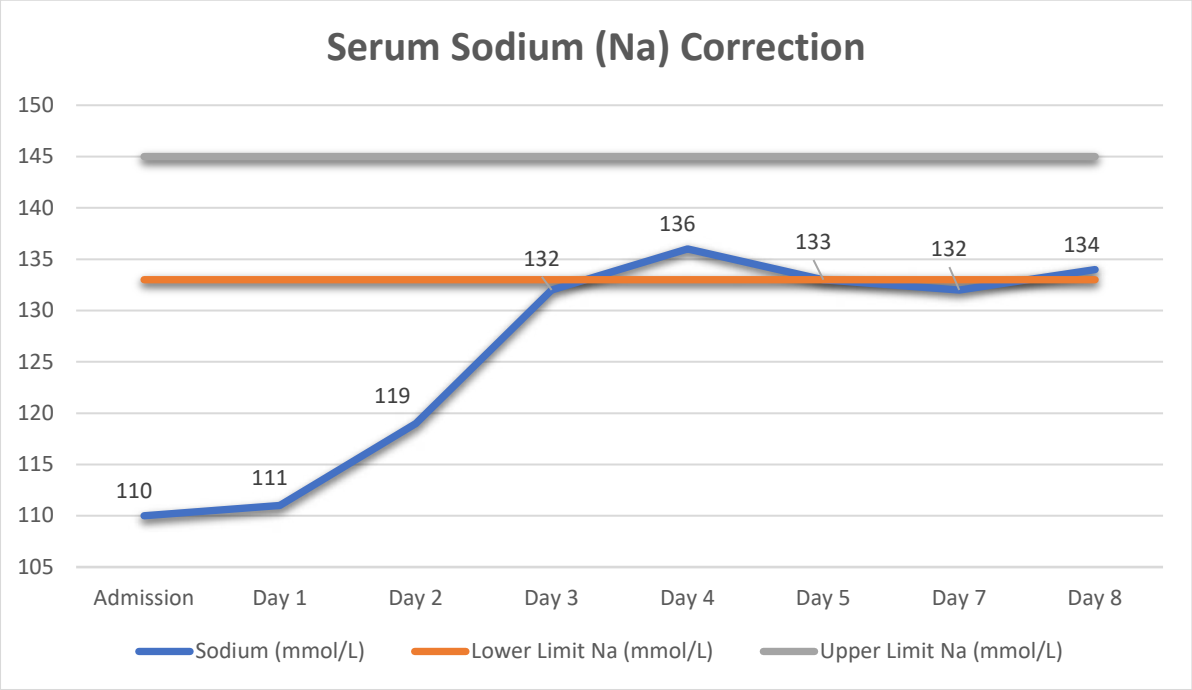

Figure 1.0 – Serum Sodium Concentration (mmol/L)/ Time (Days).

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Discussion

Carcinoma of the bladder is the ninth most common malignancy worldwide[4]. TURBT provides a safe means of diagnosis and treatment of bladder cancer. The incidence of both minor [haematuria (26.1%)] and major complications [bladder perforation (1.3-5%) and TUR Syndrome (0.6%)] are well reported in the literature[5].

Bladder perforation is considered by many as the most worrisome complication of TURBT. Extraperitoneal bladder perforation is the most common subtype and is commonly managed conservatively with free catheter drainage. Intraperitoneal perforation is associated with a significantly greater level of morbidity and mortality and is typically managed by formal laparotomy and open surgical repair.

Formal laparotomy remains the gold standard for repair of intraperitoneal bladder rupture in patients who are haemodynamically unstable or for those in whom another intraabdominal injury is suspected[6]. In patients who do not meet this criteria, laparoscopic intervention is increasingly being favoured due to the shorter hospital stay length and reduced postoperative pain[7]. Percutaneous drain insertion is significantly less invasive and can be administered under local anaesthetic sparing patients from both anaesthetic and operative morbidity. Comparison of percutaneous drainage and open/laparoscopic repair is not possible given the present dearth of reporting in the literature.

The negative impact of iatrogenic bladder perforation on patient prognosis has been well explored, with minor perforation thought to be under-reported[8]. Lower incidence of obturator jerk and bladder perforation is associated with bipolar resection in comparison to monopolar[9]. Mono-polar resection is most commonly carried out using glycine irrigation, which has a greater association with electrolyte disturbance[10]. Hence, the use of bipolar diathermy during TURBT may reduce the risk of bladder perforation and subsequent electrolyte disturbance.

Percutaneous drain insertion can provide effective management of intraperitoneal bladder rupture in the haemodynamically stable patient in which no other intra-abdominal injury is suspected.

Declarations of Conflicts of Interest:
None declared.

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