

Acute kidney injury as a severe complication of DKA

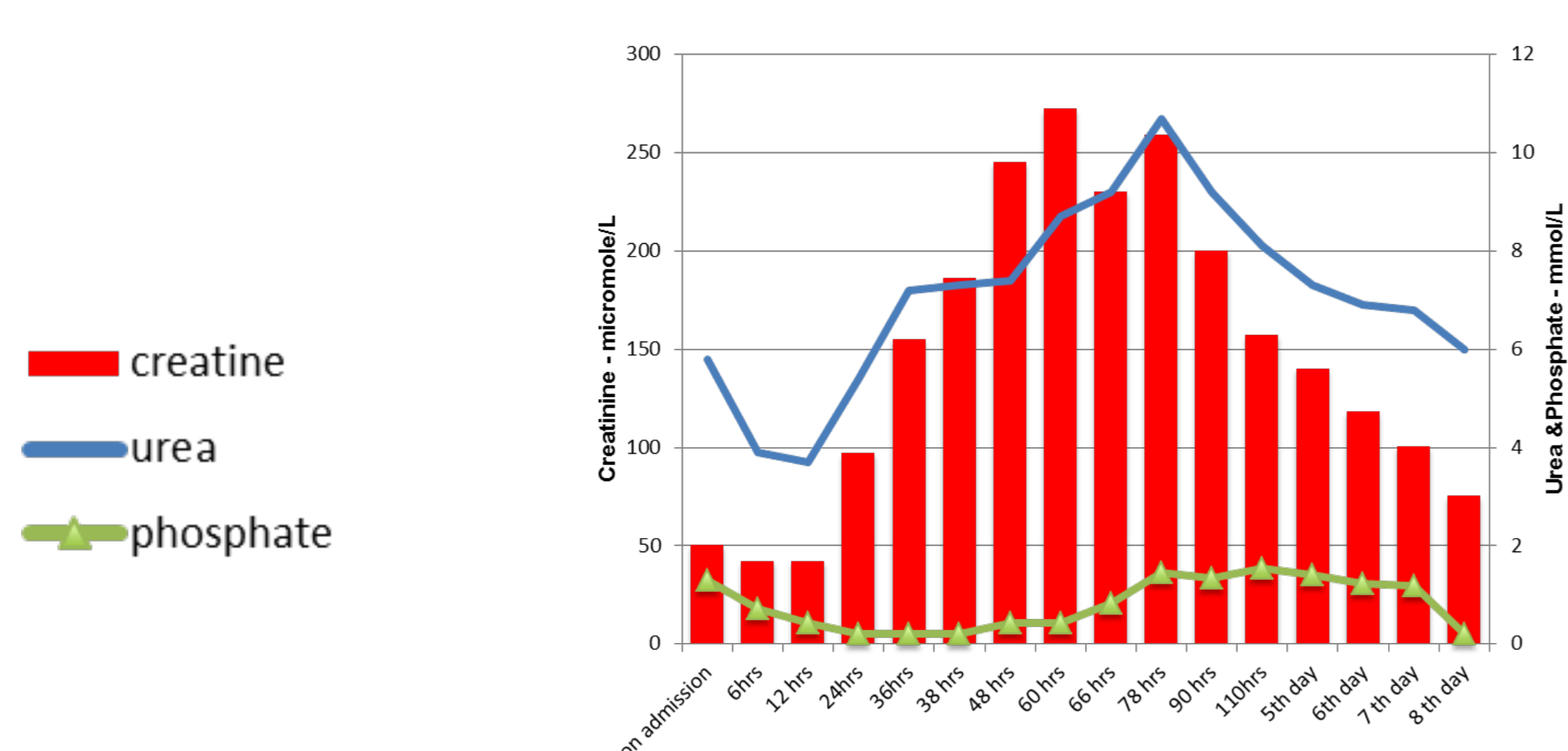
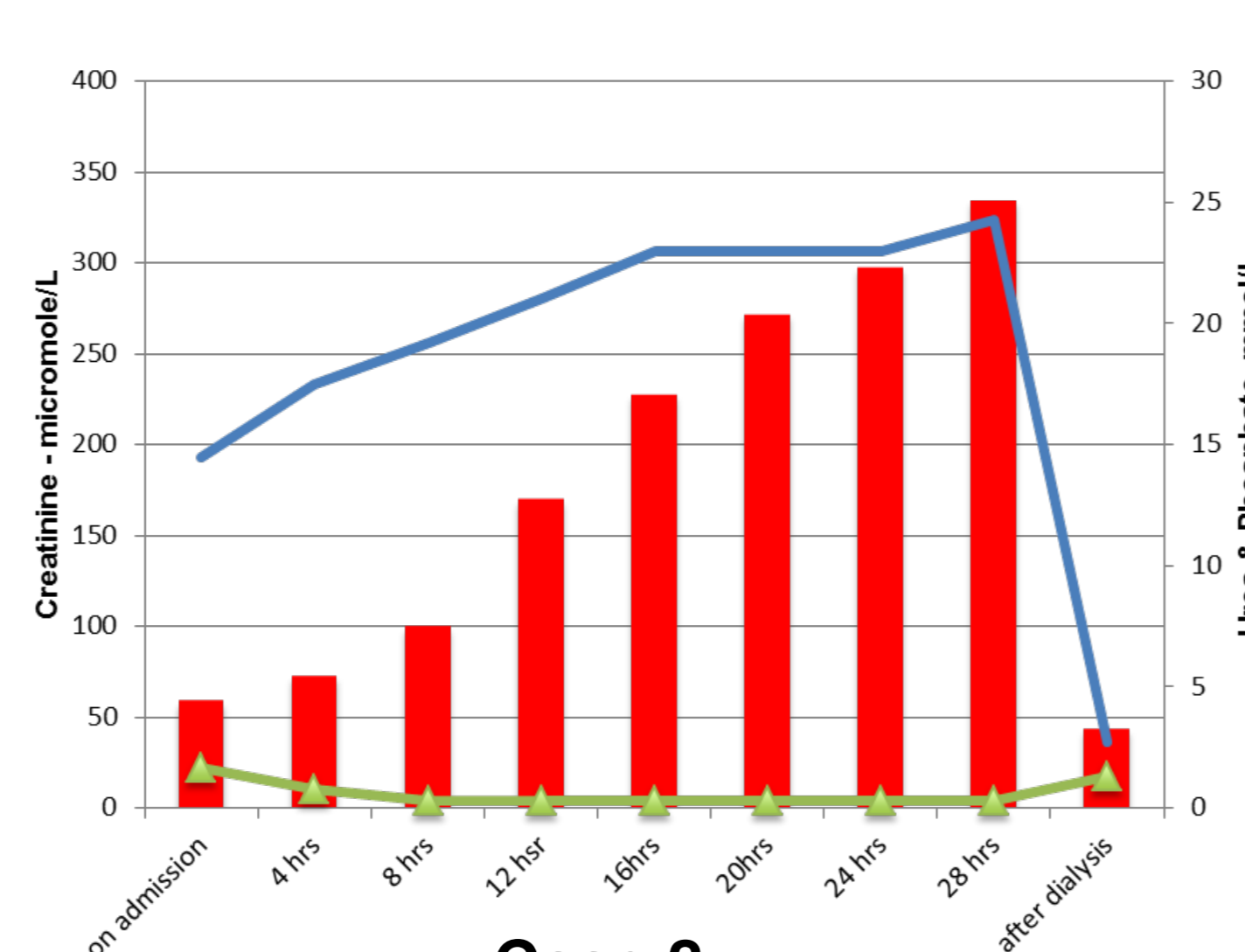
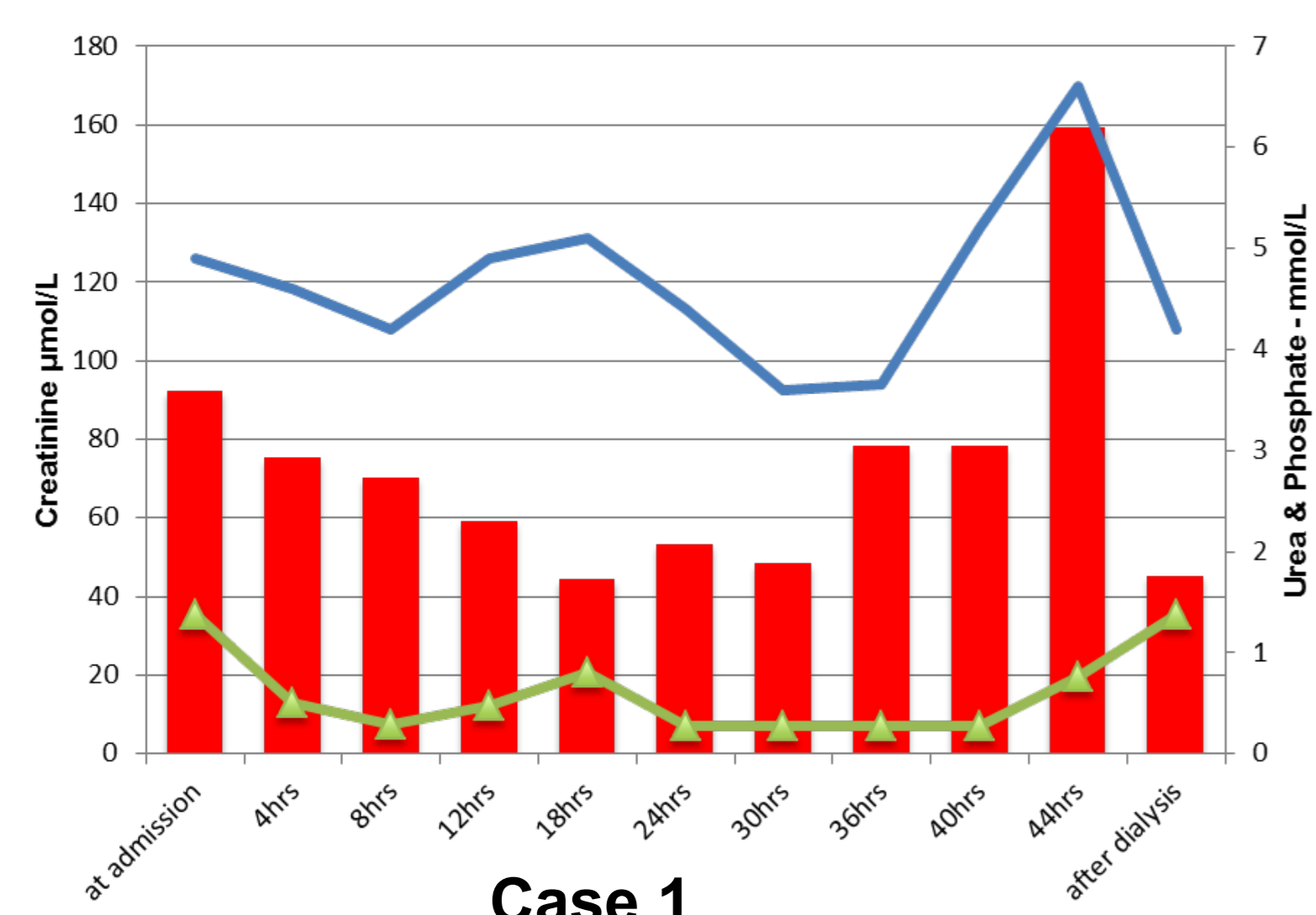
Introduction

- Acute kidney injury [AKI] is one of the potentially fatal complications of DKA, although it is rare ¹
- KDIGO (Kidney Disease – Improving Global Outcomes) AKI definition for children ²**
 - Increase in serum creatinine by ≥ 26.5 micromol/L (≥ 0.3 mg/dL) within 48 hours **or**
 - Increase in serum creatinine to ≥ 1.5 times baseline within the previous seven days **or**
 - Urine volume ≤ 0.5 mL/kg/hour for six hours
- Reported mortality in AKI complicating DKA is about 50% ³
- So far, only few case reports of DKA with AKI have been reported in the literature
- We present 3 cases of DKA complicated by AKI

Case Series

	Case 1	Case 2	Case 3
Age	9 yrs	14 yrs	17 yrs
Sex	Female	Female	Female
Diagnosis	Newly diagnosed T1D	Newly diagnosed T1D	Poorly controlled T1D
Presentation	Severe DKA Severe dehydration	Severe DKA Severe dehydration	Severe DKA Severe dehydration
BP	Initially normal At 48 hrs, high 150/100	Normal	normal
Urine output	Oliguria < 0.5 ml/kg/day at 36 hours	Reducing urine output at 24 hrs and oliguria at 36 hours	Reducing urine output at 36 hrs Followed by oliguria
USS Kidney	kidneys appeared large & bilateral hydronephrosis (ATN induced papillary necrosis)	Enlarged kidney	Normal size kidney

Renal parameters and management



Discussion

- AKI is a rare complication of DKA in children
- Etiology of AKI is almost certainly multifactorial presumably due to hypovolemia and hypotension
- The 3 cases we present had severe DKA and dehydration leading to hypovolemia
- Prolonged hypoperfusion of kidneys initiate AKI leading to renal failure
- The principle of fluid management in children with DKA is conservative while rapid correction of hypovolemia is needed to prevent AKI, thereby presenting a dilemma to the clinicians
- Renal rescue therapy (RRT) should be initiated prior to the development of significant signs and symptoms of AKI induced renal failure
- Early initiation of RRT in critically ill child requires collaboration with multidisciplinary team including paediatric nephrologist and critical care to improve outcome

Conclusions

- Patients with severe DKA are at risk of AKI due to hypovolemia
- Appropriate management of hypovolemia and electrolyte disturbance in these patients can be challenging
- These cases highlight the importance of early recognition of AKI (rising plasma urea, creatinine and oliguria) and discussion with paediatric nephrologist to formulate an individualised fluid therapy in order to prevent deterioration in renal function
- The impact, if any, of recent modification in fluid management of children with DKA, on the risk of AKI remains uncertain

References

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