

Management Of Chronic Hypotension in Anuric Paediatric Dialysis Patients With Midodrine Hydrochloride

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Introduction

Chronic hypotension and intra-dialytic hypotension in anuric children with fluid overload is a frustrating problem that prevents achievement of euvolaemia with dialysis. Consequently these children are at risk from acute haemodynamic instability, ischaemia, cardiac arrhythmia and cardiac arrest related to severe hypotension during dialysis. Chronic fluid overload has a deleterious effect on the cardiovascular system.

Midodrine is an oral alpha 1-agonist with anti-hypotensive/vasopressor properties. In an effort to improve treatment tolerance and ultrafiltration, we commenced midodrine therapy in 9 children who failed to tolerate ultrafiltration despite interventions such as sodium and ultrafiltration modelling, increased frequency of dialysis and blood volume monitoring.



Background

In an effort to improve treatment tolerance and ultrafiltration, we commenced midodrine therapy in 7 haemodialysis and 2 peritoneal dialysis patients who failed to tolerate ultrafiltration despite interventions such as sodium modelling, increased frequency of dialysis, blood volume monitoring, avoidance of food during dialysis, & regular review of dry weight.

Patient (age/wt)	Prior to Midodrine BP/Average UF	BP with Midodrine therapy	Average UF & Adverse Events	Dose
1: 2yrs 6m male 13.6kg	88/50 UF= 750-800mls	110/60	500mls-900mls No AE	2.5mg pre & mid dialysis
2: 16yrs 6m Male 56 kg	68/32 UF= 2500mls-3000mls	100/50	2000mls-3500mls No AE	10mg pre & mid dialysis
3: 1 yr 2m female 8.8kg	55/? UF=170mls -200mls	70/40	No improvement in UF tolerance	1.25mg BD
4: 6months female 5.7kg	62/27 UF = 50mls - 100mls	80/32	50mls-100mls No AE	2.5mg tds, prn
5. 14 yrs male 52kg	70/50 UF= 2500mls	98/56	3000mls-3500mls No AE	10mg Pre & mid dialysis
6. 16yrs Female 47kg	78/50 UF= 1800mls-3000mls	88/62	3000mls-3500mls AE – Skin tingling	10mg Pre,&mid dialysis 5mg TDS on non dialysis days
7. 3yr10m Female 8.1kg	74/40 UF=300mls -500mls	102/68	300mls-550mls No AE	2.5mg twice
8. 18yrs Male 48.5kg	100/60 UF= 1500mls-2000mls	110/60	1500mls-3000mls No AE	10mg twice 5mg TDS on non dialysis days
9. 15yr Male	80/50 UF= 1000mls-2000mls	98/60	1500mls-2400mls No AE	5-10 mg twice

Methods

9 dialysis dependent children between 8 months to 17 years with significant fluid overload and systolic blood pressure repeatedly at or below the 5th percentile for age received midodrine therapy.

- Midodrine was administered one hour prior to haemodialysis and again mid dialysis on dialysis days.
- Short synacthen studies were performed in four of the children and were normal.
- Blood Pressure, heart rate and oxygen saturation were recorded every 30 minutes during haemodialysis.
- Haemodialysis sessions were 5 hour treatments X 3 times weekly for school aged children and 4 times weekly for infants.
- The two infants on peritoneal dialysis received 10 hour APD; 50 minute dwell; 2.3% & 1.5% glucose fluid.

Patient Outcomes

- A review of patient data showed an increase in systolic BP 10-30 mm Hg and better tolerance of dialysis ultrafiltration in most children.
- Two adolescent patients with significant hypotension, dizziness and lethargy on non-dialysis days required additional midodrine 5mg-10mg off dialysis to control their symptoms.
- One infant on peritoneal dialysis commenced midodrine with no improvement in blood pressure, suggestive of impaired cardiac function.
- There have been no serious adverse events associated with midodrine in our patients.

Conclusions

Midodrine provided some improvement in chronic hypotension and intra-dialytic symptoms in 8 of the 9 patients.

Midodrine is removed by haemodialysis, therefore dosing prior to dialysis and mid dialysis is recommended.

