Publication Brief

Effect of Furosemide on Cardiac Index and Circulating Blood Volumes in Pediatric ICU Patients

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BACKGROUND
Although furosemide is a commonly administered diuretic in pediatric ICU (PICU) patients, its hemodynamic effects are not well defined in the literature. COstatus® permits measurement of cardiac index (CI) and blood volumes (Total End Diastolic Volume Index [TEDVI], Central Blood Volume Index [CBVI] and Active Circulation Volume Index [ACVI]) in PICU patients.

OBJECTIVE
To evaluate effect of furosemide infusion on CI and blood volumes in stable PICU patients requiring diuresis.

STUDY
- 10 PICU patients (2.8-60 kg) with indwelling arterial and venous catheters were infused with furosemide (0.5-1 mg/kg. 20 mg maximum).
- Ultrasound Flow/Dilution Measurements: An extracorporeal AV loop was connected between the arterial and venous catheters. A roller pump circulated blood (10–12 ml/min) from the artery to the vein. Body temperature isotonic saline (1.0 ml/kg, up to 30 ml) was injected into the venous limb of the loop. COstatus® measurements were performed before furosemide infusion and after infusion.
- Urine output was also measured.

RESULTS
- After furosemide infusion, CI increased in 7 PICU patients and decreased in 3 patients.
- Blood volumes largely changed when CI changed in most patients. TEDVI increased in 9 out of 10 patients; CBVI in 7 out of 10 patients; ACVI in 8 out of 10 patients.
- Urine output increased 3-4 times (mean 3.4 cc/kg/hour).

STUDY’S CONCLUSIONS
- CI and blood volumes largely increase after infusion of furosemide, despite brisk urine output.
- Data suggest that diuresis normalizes cardiac filling volumes, thus improving cardiac output.
- COstatus® may be useful in assessing the effects of medications on cardiac output and blood volumes in critically ill pediatric patients.

TRANSONIC OBSERVATIONS
- No reliable, non-invasive method exists for measuring cardiac output and blood volumes in PICU patients.
- COstatus® can measure flow and blood volumes in PICU patients through an extracorporeal loop connected between existing arterial and central venous catheters.

REFERENCES

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