

### Septic shock

#### Presentation

24 day old baby presents with clinical assessment of septic shock.

USCOM 1A examination shows a high SVI and high CI with very low SVRI, which is consistent with hemodynamic changes of septic shock.

Parameter	Baseline Measures
Vpk (Peak Velocity)	1.4
HR (Heart Rate)	167
SV (Stroke Volume)	10.6
SVI (Stroke Volume Index)	39
CO (Cardiac Output)	1.8
CI (Cardiac Index)	6.6
SVRI (Systemic Vascular Resistance)	452

#### Initial therapy

With such a high SVI and CI due to vasodilation, the question was whether to follow the guidelines with fluid challenges of 40ml/kg or to limit the fluid resuscitation to 10ml/kg?

With such a low SVRI, the next question might be, “Would a vasopressor be appropriate at this time?”

It was felt that a relatively large amount of fluid may put the baby at risk so the decision was to proceed with the fluid resuscitation guidelines and give 40ml/kg but to observe the baby’s hemodynamic response to the fluid with the USCOM 1A hemodynamic monitor.

Parameter	Base	Post 40 ml/kg
Vpk	1.4	1.7
HR	167	161
SV	10.6	13
SVI	39	44
CO	1.8	2.2
CI	6.6	8.0
SVRI	452	431

USCOM 1A examination post 40ml/kg showed the SVI change was 11%. As a fluid response 11% is considered to be negative.

A negative fluid response indicates that the preload is at the top of the Starling curve. Fortunately, at that time, the neonate’s heart was able to handle the challenge. The heart rate

was unchanged while the CO and CI increased and the SVRI reduced slightly.

# CASE STUDY

USCOM 1A in Neonatal ICU



## Follow up management

Intravenous Dopamine at 10ug/kg/min was given with the aim to increase HR and vasoconstrict the vasculature.

Now all the parameters are heading closer to expected normal values.

Fluid and Dopamine therapies changed SVI, CI and SVRI, but there was no significant change to HR.

In 2010, Norepinephrine was not a routinely recommended medication for pediatrics, although in this situation Norepinephrine should have been the first choice.

Parameter	Base	Post 40 ml/kg	Post Dobutamine
Vpk	1.4	1.7	1.5
HR	167	161	168
MD		41	32
SV	10.6	13	10
SVI	39	44	36.6
CO	1.8	2.2	1.7
CI	6.6	8.0	6.3
SVRI	452	431	683

## Summary

Monitoring SVI, CI, SVRI identified the hemodynamic changes, assisted in the decision to stop fluid and enabled the physician to effectively modify treatment with greater confidence.