Drug Dosage Calculations:

For fentanyl and midazolam, the dose calculations were as follows:[17-19]

Bolus dose over one minute (mcg/kg) = desired plasma level (ng/ml) x Vd (L/kg),

where Vd = volume of distribution

Infusion rate ($mcg \cdot kg^{-1} \cdot hr^{-1}$) = desired plasma level (ng/ml) x CL ($L \cdot kg^{-1} \cdot min^{-1}$) x 60,

where CL = drug clearance

Fentanyl:

Age	Vd (L/kg)	CL ($L \cdot kg^{-1} \cdot min^{-1}$)	Bolus	Infusion
1 month-1 year	4.45	0.018	18 mcg/kg	4.3 $mcg \cdot kg^{-1} hr^{-1}$
1-5 years	3.06	0.012	12 mcg/kg	2.8 $mcg \cdot kg^{-1} hr^{-1}$
6-9 years	2.54	0.010	10 mcg/kg	2.3 $mcg \cdot kg^{-1} hr^{-1}$
10-13 years	1.92	0.007	8 mcg/kg	1.7 $mcg \cdot kg^{-1} hr^{-1}$

The second bolus was 50% of the first dose, and the maintenance infusion rates then increased by 50% for the second measurement.

Midazolam:

Because of the reported variability in pharmacokinetic data of midazolam in children, the same initial and maintenance infusion was chosen for all ages.[20-22] Calculations were based on a CL of 0.009 $L \cdot kg^{-1} min^{-1}$, and a Vd of 1.9 L/kg. A dose of 0.29 mg/kg was followed by an infusion of 139 $mcg \cdot kg^{-1} hr^{-1}$. The second dose was 0.15 mg/kg followed by an infusion of 208 $mcg \cdot kg^{-1} hr^{-1}$.

Echocardiographic Calculations:

$$\%SF = \frac{LVEDD - LVESD}{LVEDD} \times 100$$

SF = shortening fraction; LVEDD = left ventricular end-diastolic dimension; LVESD= left ventricular end-systolic dimension

$$\%EF = \frac{LVEDV - LVESV}{LVEDV} \times 100$$

EF = ejection fraction; LVEDV = left ventricular end-diastolic volume; LVESV = left ventricular end-systolic volume

$$CO = D_a^2 \times VTI_a \times HR$$

CO = systemic cardiac output; D_a = aortic diameter; VTI_a = aortic velocity time integral.

$$SV = \frac{CO}{HR}$$

SV = stroke volume, HR = heart rate

$$SVR = \frac{MAP-CVP}{CO}$$

SVR = systemic vascular resistance, MAP = mean arterial pressure, CVP = central venous pressure.

SV, LVEDV, and CO were divided by the patient's body surface area to calculate an index to account for the different patient sizes. The SVR was multiplied by the body surface area to calculate an SVR index.