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EVMS Journal Club
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Clinical Scenario: A 10 yo child presents to the ER after falling on their bicycle. You suspect a fracture of the radius and ulna which is confirmed on XR. You sedate the child with ketamine for reduction. The fracture was successfully reduced, but the child vomits and had an emergence reaction.

P: In pediatric patients requiring sedation/analgesia for a procedure
I: is the combination of ketamine and propofol
C: compared to other PSA agents (fentanyl/propofol, propofol, etc.)
O: safe and efficacious in the ED

Article	**Study Group/Design**	**Study Type**	**Outcomes**	**Key Results**	**Limitations**
Akin *et al.* Pediatr Cardiol. 2005 Sept-Oct; 26(5): 553-7.	60 pts ASA II-III 1mo – 13 yo Card cath (CHD) 1 ug/kg Fent + 1.5 mg/kg Prop Group 1: placebo Group 2: 0.5 mg/kg Ket	Prospective RCT Double blind	Group 1 / 2: 20% dec MAP 11/3 20% dec HR 12/5 More Fent 10/3 Less additional Prop needed in Group 2	K+P maintained MAPs and HRs without affecting recovery time	Large age range Multiple doses of meds given to maintain sedation
Willman and Andolfatto, Ann Emerg Med. 2007 Jan;49(1):23-30. Epub 2006 Oct 23.	114 pt undergoing PSA in ED Community teaching hospital Median age 36 (20-58) K+P in 1 syringe, dosed per treating physician	Prospective case series	-Median dose of Ket & Prop 0.75 mg/kg (range 0.2 to 2.05 mg/kg) -4 pts airway repositioned -4 pts adjunctive sedation -3 pts mild unpleasant emergence (1 received midazolam) -Median recovery time 15 min (5-45m) -Satisfaction score 10	Few adverse events High satisfaction rates	No comparison Small study group Use of ketofol at discretion of treating physician Dose and timing not standardized
Tosun *et al.* Paediatr Anaesth. 2007 Oct; 17(10): 983-8.	90 pts ASA I-II For diagnostic upper gastrointestinal endoscopy Age 1-16 yo	Prospective RCT Double blinded	PK/PF: -additional propofol in 1st min 17/50% -no additional propofol needed 30/7% -cough 8/0 -dizziness 15/4 -vomiting 7/0 -diplopia 8/0 HR and RR sig lower in PF vs PK	Effective sedation PK stable hemodynamics and deeper sedation, but more side effects	Wide age range (quest whether SE related to age)

Sharieff *et al.* Ped Emergency Care. 2007 Dec; 23(12): 881-884.	Urban peds ED requiring sedation closed reduction of forearm fractures 20 pts (avg age 9.6) Ketamine 0.5 mg/kg Propofol 1 mg/kg	Prospective observational pilot study	19/20 reduced (1 required open reduction) Median time intervals: -5 min for reduction -10 min 1st purposeful response -38 min suitable for discharge 3 pts recalled reduction (not described as most painful aspect of visit) Complications: mild hypoxia, vomiting, and transient ataxia	Effective sedation "rapid" recovery "No clinically significant complications"	Small size (pilot study) Convenience sample 2nd dose of ketamine and/or propofol at discretion of EP
Tosun, Esmaoglu, and Coruh, Paediatr Anaesth. 2008 Jan;18(1):43-7.	32 inpatients, for ped burn wound changes PK: K 1 mg/kg + P 1.2 mg/kg PF: F 1ug/kg +P 1.2 mg/kg	RCT Double blinded	No sig difference in HR, systolic arterial pressure, oxygen saturation, RR, sedation scores PF/PK: Restlessness 47/6%	PK and PF effective Less restlessness in PK vs PF	Small study Some pts received additional propofol, ketamine or fentanyl
Messenger *et al.*, Acad Emerg Med. 2008 Oct;15(10):877-86. Epub 2008 Aug 27.	ED patients 14-65 yo ASA I/II PSA for Ortho reduction or abscess reduction Avg age: Ket (35.6) Fent (43.2)	Double blind RCT	Fent/Ket: -Intrasedation event 84/47% -Mod & severe events 52/22% Fent 5.1 (CI 1.9-13.6) x odds of having a more serious intrasedation event compared to Ketamine	Ketamine safer than Fentanyl when combined with propofol with similar efficacy Terminated after interim data safety analysis	Under-ernrollment, fixed single dose of Ket/Fen, blinding of sedating physicians was compromised (nystagmus)

Clinical bottom line: Recent studies using Ketofol (the combination of ketamine/propofol) for procedural sedation in the ED suggest that this is a safe and efficacious alternative to other sedation regimens. Often emergency physicians use a single agent, however, these studies use a combination of medications in order to use a lower dose in an effort to minimize their individual side effects. These studies suggest that ketofol may be useful in the ED, however, additional studies are needed to help delineate the optimal dosages and the most appropriate patient populations.