

TABLE 1 Relevant pediatric studies utilizing low-dose ketamine infusion

Authors (year), study type	Patients studied	Ketamine dose (mg/kg/h)	Change in pain scores	Decrease in opioid utilization	Side effects	Subjective
Pediatric oncology						
Courade et al. [9] (2019), prospective multicenter, observational	38 patients with cancer, 2-24 years	0.01-0.2	6.7→4.3 (p<0.001) from day 1→3	No	9 with poor tolerance (≥2 side effects) not requiring discontinuation	47% of patients found ketamine “very helpful”
Kajiume et al. [10] (2012), case report	5-year-old with end-stage cancer	0.12	Subjectively yes	No; increase over time with worsening symptoms	None	Ketamine improved pain control; given with lidocaine infusion
White et al. [11] (2011), case series	24 patients with mucositis, median 12 years	0.02-0.04	Reported yes, no statistical analysis	Not significant	No psychomimetic side effects	4 children requested using ketamine again
James et al. [12] (2010), case series	33 patients with mucositis, mean 5.1 years	0.02-0.04	Reported yes, based on percentage of pain scores ≥4	No	None	Not reported
Conway et al. [13] (2009), case reports	11 and 19-year-olds with end-stage cancer	0.07-0.25	Subjectively yes	No; increase over time with worsening symptoms	Visual hallucinations in one at end of life of unclear etiology	Ketamine improved pain control
Finkel et al. [4] (2007), case series	11 patients with cancer, median 10 years	0.1-1.0	Not reported	Reported yes, no statistical analysis	None reported (received benzodiazepine q12h prophylactically)	8 of 11 parents/staff noted improved in well-being
Angheliescu and Oakes [14] (2005), case report	5-year-old with end-stage cancer	0.11	Subjectively yes	45% reduction in one opioid	None	Ketamine improved pain control
Tsui et al. [15] (2004), case report	2-year-old with end-stage cancer	0.1-0.2	Subjectively yes	Initially yes; increased over time with worsening symptoms	None	Ketamine improved pain control
Klepstad et al.	12-year-old	Not	Subjectively	Increase	Received	Pain relieved

[16] (2001), case report	with end-stage cancer	reported per kg	yes	over time with worsening symptoms	benzodiazepines prophylactically; myoclonus at end stage of unclear etiology	by addition of ketamine
Fine [17] (1999), case report	15-year-old with end-stage cancer	Not reported per kg	Subjectively yes	50% decrease	None	Ketamine improved pain control
Pediatric sickle cell vaso-occlusive pain						
Nobrega et al. [18] (2018), case series	80 patients, 181 ketamine infusions, median 15 years	0.05-1.0	Yes, though compared baseline mean with after ketamine discontinuation mean	Yes, though compared baseline mean with after ketamine discontinuation mean	No noted side effects	Not reported
Neri et al. [19] (2014), case series	33 patients, mean 15.6 years	0.1-0.15	No	No	3 patients discontinued due to dysphoria	Not reported
Tawfic et al. [20] (2014), case series	11 patients, 1 pediatric patient (16-year-old)	0.2-0.25	Yes, no statistical analysis for single patient	Yes, no statistical analysis for single patient	Used with midazolam infusion prophylactically, 1 patient with psychomimetic side effects	Not reported
Zempsky et al. [21] (2010), case series	5 patients, mean 13.4 years	0.06-0.2	No statistical analysis	In 1 of 5 patients, no statistical analysis	One patient with dysphoria requiring discontinuation, one with hypertension, nystagmus and unresponsiveness	2 of 5 patients achieved adequate pain control
Pediatric chronic pain						
Masarachchia et al. [22] (2019), case series	172 patients, 280 ketamine infusions (83% for chronic pain), mean 14 years	0.2-0.3	Yes, comparing pre- and post-ketamine	No	52 incidences of side effect, none resulting in termination of ketamine infusion	Not reported
Sheehy et al. [23] (2015),	63 patients, 277 ketamine	0.1-0.3	Yes, comparing pre-	No	None	Not reported

case series	infusions, median 15 years		and post- ketamine			
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