

Table 1. Protocol for a dose of an administration

	Administration dose
Thiopental	Initial dose; 25 mg/kg, 2 nd Dose; 12.5 mg/kg
Midazolam ²	Initial dose; 0.5 mg/kg, 2 nd Dose; 0.25 mg/kg
Chloral ^f	Initial dose; 75 mg/kg, 2 nd Dose; 40 mg/kg
Ketamin ^d	Initial dose; 4 mg/kg, 2 nd Dose; 2 mg/kg

1. The dose of thiopental is 50 mg/kg for infants under 6 months of age, 35 mg/kg between 6 and 12 months and 25 mg/kg for older children. The maximal dose does not exceed 750 mg.
2. The maximal dose does not exceed 15 mg.
3. Irrespective of initial route, 2nd dose is administered through rectal route.
4. Co-administered with 0.01 mg/kg atropine for decreasing hypersecretion.

1,2), , chloral hydrate . Chloral

thiopental hydrate 가 ,

가 가 , , .

가 , , .

100 mg/ml thiopental, 3 mg/ml midazolam, 10 mg/ml chloral hydrate

1. (7~8 Fr.) 6 cm

2001 1 1 2002 6 30 1

6 5~6

4~5 cm

30 kg (, ASA physical 가 .) 1~2 ml

status 2) . 5

benzodiazepine .

, ASA physical status 3 , 1

가 .

2. 가 Ramsay Ramsay

5 ³⁾ (Table 2).

Thiopental, midazolam, ketamine, chloral hydrate (good), (adequate), (bad) 가 , 3, 2, 1 (good) 가 (adequate) 가

ketamine . 가

Thiopental, midazolam , ketamine , (bad) 가

Table 2. Ramsay scale for sedation

Level	Definition
1	Patient awake, anxious and agitated or restless, or both
2	Patient awake, cooperative, oriented, and tranquil
3	Patient awake, responds to commands only
4	Patient asleep, brisk response to light glabellar tap or loud auditory stimulus
5	Patient asleep, sluggish response to light glabellar tap or loud auditory stimulus
6	Patient asleep, no response to light glabellar tap or loud auditory stimulus

Table 3. Demographic data

	Thiopental	Midazolam	Ketamine	Chloral	p-value
N (n)	21	23	21	21	
A (month)	22.6±11.9	23.4±13.7	23.1±12.8	21.7±12.0	0.98
W (kg)	12.1±2.2	12.3±2.6	11.8±2.2	11.8±2.6	0.90

N = number, A = age, W = weight

Table 4. Comparison of the induction time, the Recovery time, Ramsay scale and the sedative effects for procedure

	Induction (min)	Recovery (min)	Ramsay	SEP
Thiopental	7.6±4.0	54.1±11.8	5.4±1.0	2.9±0.5
Midazolam	8.0	28.0	1.7±0.7	1.0±0.2
Chloral	36.0±7.0	76.2±11.4	5.7±0.5	2.1±0.4
Ketamine	7.4±3.8	64.8±18.2	6.0±0.2	2.9±0.3
p-value	0.00	0.00	0.00	0.00

Induction = induction time, Recovery = Recovery Time, Ramsay = Ramsay scale, SEP = sedative effects for procedure

. 2 thiopental Scheffe test
가 1 midazolam
thiopental
Ramsay
thiopental 3
5%
90%
20 mmHg
86 thiopental 21
midazolam 23, chloral 21, ketamine
21
가 (ANOVA test,
SPSS 10.1 package p>0.05) (Table 3).
thiopental
Ramsay ANOVA test
tal 7.6±4.0, 54.1±11.8, midazolam 8.0,
28.0, chloral 36.0±7.0, 76.2±11.4,

Table 5. Comparison of thiopental group with chloral group and ketamine group for the induction time and the recovery time

Variables			Mean difference	p-value
Induction time	Thiopental	Chloral hydrate	-28.40	.000
		Ketamine	.219	.991
Recovery time	Thiopental	Chloral hydrate	-22.14	.000
		Ketamine	-10.76	.056

Table 6. Comparison of thiopental group with midazolam group, chloral group and ketamine group for the ramsay scale and the sedative effect for procedure

Variables			Mean difference	p-value
Ramsay scale	Thiopental	Midazolam	3.69	.000
		Chloral hydrate	-0.29	.571
		Ketamine	-0.52	.087
Sedative effect for procedure	Thiopental	Midazolam	1.81	.000
		Chloral hydrate	0.71	.000
		Ketamine	-0.05	.978

Table 7. Adverse effects

	Thiopental	Midazolam	Ketamine	Chloral
Adverse Effects; N	Desaturation; 1 Decrease in BP & Bradycardia; 1	Hyperactivity; 2	Vomiting; 2 Hypersecretion; 8	Vomiting; 2 Hyperactivity; 6

N; number of patients, BP; blood pressure

ketamine 7.4±3.8, 64.8±18.2 가 (Table 4).
 midazolam 가 1 Midazolam 3, ketamine 2, chloral 2, 6 (Table 7).

(p<0.001), ketamine 가 (p>0.05) (Table 5).

Ramsay thiopental 5.4±1.0, 2.9±0.5, midazolam 가 1.7±0.7, 1.0±0.2, chloral 5.7±0.5, 2.1±0.4, ketamine 6.0±0.2, 2.9±0.3 가

thiopental Ramsay midazolam (p<0.001), chloral ketamine 가 (Table 6).

, thiopental midazolam chloral (p<0.001), ketamine 가 (p>0.05) (Table 6).⁵⁾ Table 8

Thiopental 1 ,

Table 8. Indications for sedation

	A	B	C	D	E	Total
Thiopental	4	1	0	15	1	21
Midazolam	8	5	2	7	1	23
Chloral	11	3	0	5	2	21
Ketamine	12	3	4	0	2	21

A; suture for facial laceration (including orbit area)
 B; suture for other laceration
 C; reduction for dislocation or fracture
 D; radiologic diagnostic test (CT, MRI)
 E; foreign body removal in nose or esophagus and other painful procedure

가 가
 가 0.5 mg/kg 8). midazo
 lam 23 1 Ramsay 5
 deep sedation
 6). midazolam , Ramsay
 Ramsay 5
 7,9). , , 가 가
 chloral , opioid 가 10-13). Midazolam
 hydrate, benzodiazepine (midazolam, diazepam), flumazenil 가
 ketamine, pentobarbital, methohexital, thiopental, 8).
 propofol, etomidate, cocktail of meperidine, Thiopental short-acting pentobarbital
 promethazine and chlorpromazine 5). 3
 Midazolam 14). Thiopental
 benzodiazepine . 20~30
 가 benzodiazepine
 가 1.5~3 , ,
 가 , , Thiopental
 1 , , ,
 (first-pass metabolism) 14). , , ,
 50% 가 , Alp 15)
 3~5 3 (10%), 2 (6.6%), 2
 (6.6%), 1 (3.3%) . Glasier 16)
 PSA (Procedural seda- 52 (11%)
 tion and analgesia) 가
 15 . Nguyen 17)
 가 9~29 10 (1.9%)
 7,8). midazolam 가
 ,
 midazolam 0.2~0.35 mg/kg 1 , 1 가

10

atropine 0.01 mg/kg

. Green ²⁷⁾ 1022

4 , 2

. Ketamine 가

²⁹⁾

ketamine

1985

conscious sedation

. Conscious seda-

tion 가

가 , deep sedation

가

가 ³⁰⁾

deep sedation

conscious sedation . 2002
JCAHO (the Joint Commission on Accreditation of
Healthcare Organization)

mild sedation, deep sedation, dissociative
sedation, general anesthesia, procedural sedation
and anesthesia (PSA) ³⁰⁾

mild sedation rectal midazolam , deep
sedation rectal thiopental , dissociative sedation
ketamine chloral hydrate

deep sedation 가

가

가

가

가

가

가

delayed sequale

()

가

thiopental

가

가

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