

- Bispectral Index System Isoflurane *

Measurement of Minimal End-Tidal Concentration of Isoflurane by Using Bispectral Index System in Combined General-Epidural Anesthesia

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Abstract : One of the benefits of combined general-epidural anesthesia (CGEA) is the capability reducing the inhalational agent concentration. We evaluated the minimal end-tidal isoflurane concentration during CGEA by using Bispectral Index System (BIS). Twenty patients undergoing total hip arthroplasty were randomly selected. After general anesthesia with isoflurane and pure oxygen, 2.0% mepivacaine was injected through epidural catheter. Subsequently, end-tidal isoflurane concentration was reduced from 1.0 to 0.8, 0.6 and 0.5 vol% at 10 minutes intervals, and BIS scores were checked at each isoflurane concentration. The BIS score below 50 is considered to be an optimal level for sedation and hypnosis. The result showed that the BIS scores of 1.0, 0.8, 0.6 and 0.5 vol% of end-tidal isoflurane concentration were 43.9 ± 7.6 , 44.8 ± 7.0 , 45.8 ± 6.0 and 50.3 ± 6.7 , respectively. Therefore we conclude that the minimal end-tidal isoflurane concentration for CGEA with pure oxygen was 0.6 vol%.

Key Words : Bispectral index, Combined general-epidural anesthesia, Isoflurane

			mL/kg	
	neuraxial block			midazolam 0.07 mg/kg,
	[1],			pentothal sodium 3 mg/kg, fentanyl 1 µ
				g/kg, vecuronium 0.1 mg/kg
[2,3]. Hodgson [3]	lidocaine		4	
sevoflurane	-	L/min	isoflurane	
	lidocaine		10	
			2% mepivacaine 12 mL	
	50%		가	가 (Capnomac
			Ultima , Datex,	) isoflurane
			1.0, 0.8, 0.6	0.5 vol%
isoflurane		bispectral	10	가 isoflurane
index system(BIS)				BIS
				BIS
				(A-2000 BIS monitor, Aspect Medical
				System,) signal quality
				index(SQI) electro-myography(EMG)
				BIS 가 50(BIS ₅₀)
	65			
			BIS	BIS
1, 2		20		BIS
			가 50	isoflurane
			가	
			60 mmHg	
	30	midazolam	ephedrine(8-12 mg)	
0.05 mg/kg, glycopyrrolate	0.2 mg		60 mmHg	
			SPSS	(version
	2-3	3-4	10.0)	isoflurane
18G Tuohy			BIS	, p
			0.05	
		4-5		
cm				
		2% mepivacaine		
3 mL	10-15	10	-	20

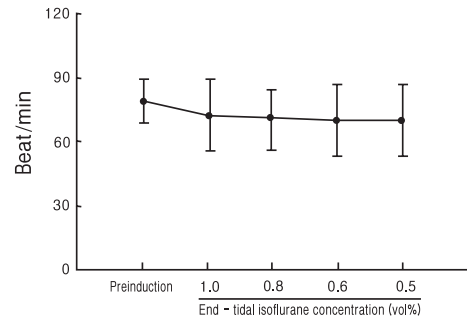
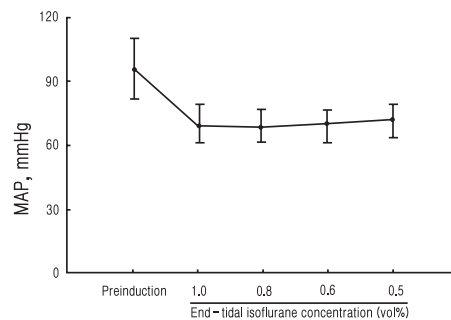
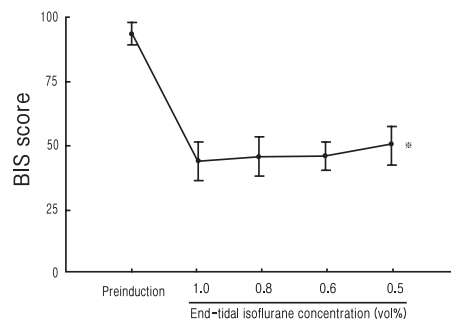
가 12 , 가 8 .
 56.6 ± 14.2 , 59.6 ± 8.4 kg
 , 163.4 ± 7.6 cm
 (Table 1). 79.8 ± 19.1 -
 isoflurane 1.0, 0.8, 0.6
 0.5 vol% 72.6 ± 16.5 , 71.1 ± 15.2 , 70.3 ± 16.1 , 69.7 ± 15.4
 (Fig. 1). 96.1 ± 16.3 mmHg -
 isoflurane
 1.0, 0.8, 0.6 0.5 vol%
 69.2 ± 9.7 , 68.3 ± 7.1 , 70.3 ± 7.8 ,
 72.3 ± 7.6 mmHg (Fig. 2).
 BIS 93.9 ± 4.7
 - isoflurane
 1, 0.8, 0.6 0.5 vol%
 43.9 ± 7.6 , 44.8 ± 7.0 , 45.8 ± 6.0
 50.3 ± 6.7 (Fig. 3).

[4].

Table 1. Demographic data

	Subjects (n=20)
Sex (M/F)	12 / 8
Age (yr)	56.6 ± 14.2
Height (cm)	163.4 ± 7.6
Weight (kg)	59.6 ± 8.4

Values are presented as mean $\pm$ SD, except for sex.

**Fig. 1.** Changes in heart rate (HR) after combined general-epidural anesthesia with isoflurane.**Fig. 2.** Changes in mean arterial pressure (MAP) after combined general-epidural anesthesia with isoflurane.**Fig. 3.** Changes in Bispectral Index System (BIS) score after combined general-epidural anesthesia with isoflurane. *: P<0.05 compared with 1.0 vol% of end-tidal isoflurane.

가 neuraxial block
 가 ,

[1]. neuraxial block

가 , - BIS
가 가
[5-7], [8], isoflurane
- BIS₅₀
[3,8,9] . isoflurane 0.6
Pollock [10] lidocaine vol% .
BIS₅₀
, Glass [11] BIS 가 50
가 . Hodgson [3] lidocaine sevoflurane -
. BIS
sevoflurane
lidocaine 50% (frequency), (amplitude)
(coherence)
[11,13]. Isoflurane BIS가
midazolam, 40-50%
thiopental, propofol [2,3,5,9]. [11,13]. BIS
, BIS propofol,
midazolam, isoflurane
[11]. lidocaine 가 [11,14]. BIS
[6].
Lidocaine . 가
BIS₅₀ , BIS
sevoflurane 가 34% 가
[12]. lidocaine [15].
sevoflurane 가
BIS [4,10].
가

BIS

가 . 가 BIS

BIS

가 .

100% isoflurane

- BIS₅₀

isoflurane

0.6 vol%

BIS

-

-

-

isoflurane

BIS

-

isoflurane BIS₅₀

isoflurane 0.6 vol%

-

isoflurane

0.6 vol%

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