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1.	5
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(baricity)

, ,

.

.

,

가

.

.

가

.

tetracaine

0.1% 0.2%

. 0.1% tetracaine

8ml(8mg),

7ml(7mg)

, 0.2% tetracaine

4ml(8mg),

3.5ml(7mg)

.

(pain)

pin - prick

,

Bromage motor scale

가

.

0.1% (T 5.7)가 0.2% (T 6.7)

,

0.1% (11.4)가 0.2% (12.3)

0.9

.

0.1%가 10

0.2%

15

.

(complete)

.

,

가

.

가 . 가 2-3
0.1% tetracaine 0.2%
가 , .
0.1% 0.2%
tetracaine 0.1%

: , , , tetracaine

<

>

•

가

(concentration),

(dose),

(volume),

(baricity)

,

,

¹.

Babcock

, 1927

Pitkin

².

.

,

가

²⁻⁵.

가

⁶.

가

,

가

0.1% tetracaine
(motor block)

0.2% tetracaine
(sensory block)

,

,

•

1.

27 가
 1 2
 0.2% tetracaine 13 0.1% tetracaine 14 ,
 tetracaine
 가 (Table 1).

2.

1 midazolam 2-3mg
 가
 가 10-15
 가 300-500ml
 3-4 22G
 (bevel)
 0.2ml/sec
 0.1% tetracaine 1% tetracaine 1ml(10mg)
 9ml 1:200,000 epinephrine 8ml(8mg),

7ml(7mg) . 0.2% tetracaine 2% tetracaine
1ml(20mg) 9ml 1:200,000 epinephrine
4ml(8mg), 3.5ml(7mg) .
10 . 30 5
, 30 가
25G pin-prick
(dermatome) . Bromage motor scale(Table 2)
7 가 .
pin-prick
, (time for maximal
sensory block) . (sensory block duration)
12 pin-prick
. (time for complete motor
block) Bromage motor scale
grade 3가 , (motor block
duration) grade 3 2 .
20%
. 72 .
Mean ± SD . unpaired
t-test , p < 0.05 .

•

0.1% 5.7 ± 2.7 , 0.2% 6.7 ± 2.3

0.1% tetracaine .

0.1% 11.4 ± 4.6 0.2% 12.3 ± 3.9 0.9

10.0 ± 3.9 0.2% 15.0 ± 5.0 0.1% (p<0.05).

가 (Table 3).

0.1% 0.2% Grade 3

가 0.2% 1 fentanyl

0.1% 3 , 0.2% 1

metoclopramide(, ,) atropine

0.1% 0.2% 3 ephedrine

(Table 4).

72 0.1% 3 ,

0.2% 2 2-3 가 .

(voiding difficulty)가

(Table 5).

Table 1. Demographic data

	0.1% Tetracaine	0.2% Tetracaine
Patients number(m/f)	14(8/6)	13(9/4)
Age(yrs)	49.5 ± 11.9	48.2 ± 11.1
Body weight(kg)	61.4 ± 11.7	66.5 ± 9.8
Height(cm)	164.4 ± 6.3	165.5 ± 7.9

All values except sex ratio are expressed as mean ± SD.

Table 2. Bromage motor scale

0	: No motor block
1	: Inability to raise the extended leg
2	: Inability to flex the knee joint
3	: Inability to flex the ankle joint

Table 3. Assessment of spinal anesthesia

	0.1% Tetracaine	0.2% Tetracaine
Sensory level(thoracic)	5.7 ± 2.7	6.7 ± 2.3
Sensory block time(min)	11.4 ± 4.6	12.3 ± 3.9
Sensory block duration(min)	212.1 ± 36.2	196.2 ± 43.2
Motor block time(min)	10.0 ± 3.9	15.0 ± 5.0*
Motor block duration(min)	210.0 ± 31.1	216.9 ± 27.8

All values are expressed as mean ± SD. Sensory block time: time for maximal sensory block, Motor block time: time for complete motor block,

* : p < 0.05, compared to 0.1% tetracaine group

Table 4. Intraoperative complications of spinal anesthesia

	0.1% Tetracaine	0.2% Tetracaine
Pain	0	1
Nausea	3	1
Hypotension	3	3

Data are expressed as the number of patients.

Hypotension was defined when the blood pressure was less than 80% of the preanesthetic value

Table 5. Postoperative complications of spinal anesthesia

	0.1% Tetracaine	0.2% Tetracaine
Headache	1	1
Back pain	3	2
Voiding difficulty	1	0

Data are expressed as the number of patients.

•

(concentration), (dose), (baricity), (volume),

, , .

,

가 .¹

가

²⁻⁵

8

가

가

.

가

⁶

,

가

,

가

.

가

가

.

Nolte Stark⁹ 0.5% bupivacaine

, Axelsson¹⁰ bupivacaine 가

, Brown¹¹ 0.5% tetracaine

가 , Bengtsson¹², Shesky¹³
0.5% 0.75% bupivacaine , ,
. McClure¹⁴ 가
, 가 가
, 가
. Rosenberg¹⁵ 0.1% 0.33% tetracaine 10ml(10mg),
3ml(10mg) 가 0.1% 0.33%
0.33%
, .
Kuusniemi¹⁶ 0.18% 0.5% bupivacaine 3.4ml(6.1mg),
1.2ml(6mg) 가
. Kuusniemi¹⁶
가 3 가
. Rosenberg¹⁵가 0.1% tetracaine 10ml Kuusniemi¹⁶
0.18% bupivacaine 3.4ml .
0.2% 0.1% 가
, 0.2%
가 1 . 가
가
가
가 , 0.2% tetracaine 0.1% tetracaine
.

, . 0.2% 0.1% 가 5

. Lund Rumball⁴ 0.1% tetracaine
 0.05% tetracaine

, Kallos Smith⁵ 0.1% tetracaine
 가 , 0.15%
 tetracaine

0.2% tetracaine . 0.1%
 가 ,

, Axelsson^{10,17} 0.2% 0.1% tetracaine
 0.1%

tetracaine 0.2% tetracaine 17-20

가

가 18-20

0.4% tetracaine , 37°C

1% tetracaine

15 0.1%, 0.2% tetracaine

epinephrine

가 , 가

epinephrine phenylephrine ,

!

가 가

10

, 0.1% 11.4 , 0.2% 12.3

metoclopramide

atropine 가 , ephedrine

가 2-3 가

•

0.2% tetracaine
가
가
tetracaine
0.1% tetracaine
0.1%, 0.2%
tetracaine
, 0.2% 0.1%
가
0.1% tetracaine
가
0.1% tetracaine
0.2%
가
0.1% tetracaine
0.1% tetracaine
0.1% tetracaine
0.2%

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Abstract

The effect of the injected volume on the spread of spinal anesthesia with hypobaric tetracaine

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Twenty-seven adult patients scheduled for total hip replacement were assigned randomly to two groups, one with 0.1% (n=14), and the other with 0.2% (n=13) hypobaric tetracaine spinal anesthesia. The hypobaric solutions were made with distilled water. Eight mg of tetracaine was used for male patients and 7mg for female patients. Hence the injected volumes were 8ml for male and 7ml for female in 0.1% solution and 4ml for male and 3.5ml for female in 0.2% solution, respectively. Epinephrine was mixed to either solutions in concentrations of 1:200,000. The site of lumbar puncture was L3-4 intervertebral space with 22G spinal needle. The speed of injection was fixed at the rate of 0.2 ml/sec.

The height of sensory block with the 0.1% was one dermatome higher(T5.7) than with the 0.2% tetracaine solution(T6.7). The time for

sensory block(11.4 min vs 12.3 min) and the time for motor block(10.0 min vs 15.0 min) with 0.1% was shorter than that with 0.2% tetracaine solution. The duration of sensory block and the duration of motor block were not significantly different in both groups. Complete motor block was achieved in all patients.

In conclusion, both the 0.1% and the 0.2% hypobaric tetracaine spinal anesthesia are suitable for total hip replacement. However we could get better results with 0.1% than with 0.2% tetracaine such as rapid and high sensory block with rapid motor block. But further evaluations for the different volume and concentration with hypobaric spinal anesthesia are needed.

Key Words : concentration, hypobaric spinal anesthesia, tetracaine, volume