

## *Comparative study between intrathecal injection of hypobaric lidocaine 0.5% and isobaric lidocaine 2% in perianal fistula*

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### **Abstract**

**Aim:** The aim of the study is to evaluate the efficacy of 0.5% lidocaine when given intrathecally in perianal surgery in comparison to lidocaine 2% concentration, and to study the effect of change in patient position on sensory anesthesia. **Patient and Methods:** forty patients aged between 18–70 years with ASA I– II who were scheduled for perianal fistula surgeries under spinal anesthesia were enrolled in our study after written informed consent and approval of ethical committee; This Study was conducted in Sohag University Hospitals from August 2016 to March 2017. Patients Were divided into 2 equal groups:- (Group I) 20 received 8ml (0.5%) lidocaine (prepared by adding 2ml(40 mg) 2% lidocaine to 6ml sterile distilled water ). Subarachnoid block will performed in jack-knife.- (Group II)20 patients received 2ml lidocaine 2% (40mg) with the same technique, After injection patient will turned to lithotomy Position with table in horizontal Level. Under complete aseptic conditions, spinal anesthesia was carried out in the sitting position, at level (L3-4 or L4-5). After a free flow of cerebrospinal fluid was confirmed, each patient received one of the coded spinal solutions (GI or GII).Immediately after administration; the patients were turned into the supine or jack-knife position. Patients were monitored for: Heart rate; NIBP and Oxygen Saturation. Patients were observed for onset, duration of sensory block and motor block, hemo dynamic stability; In the post- anesthesia care unit (PACU). Complications also were observed .

**Results** The onset of sensory is faster in hypobaric lidocaine but duration and time needed to reach highest sensory level longer in isobaric, onset of motor block is faster in hypobaric but duration of motor block longer in iso baric lidocaine hemo dynamic stability more in iso baric .

**Conclusion** The use of hypo baric lidocaine reveal early onset for sensory and motor block with early recovery than isobaric and hemo dynamic stability slight more in iso baric lidocaine in short stay surgeries as perianal surgeries.

### **Introduction:**

The physical characteristics of spinal anesthetic solutions are major determinants of their spread in cerebrospinal fluid. The four physical characteristics that are most important are density of the anesthetic solution, the amount of anesthetic given, the concentration of the anesthetic in the

injectate and the volume of local anesthetic injected (*Greene NM 1985*).

The baricity is the ratio of the density of the anesthetic solution to the density of the cerebrospinal fluid. Local anesthetics can be injected intrathecally as hyper-, iso-, hypobaric solutions (*Greene NM 1985*).

-Hypobaric spinal intrathecal anaesthesia is commonly used for patients with perirectal surgery in the prone (jackknife) position (*Bodily et al; 1992*)

Lidocaine is amide derivative, rapid onset local anesthetic, may be stored for long periods without loss of potency and is not sensitive unless mixed with glucose to produce hyperbaric spinal solution (*Atkenhead et al; 1990*)

Lidocaine 0.5% provided effective spinal intrathecal anaesthesia for minor surgery producing a fairly rapid onset of block, early return of motor function and minimal side effects (*Liew QY 1994*)

-Control of level of analgesia produced by an isobaric solution is difficult, the most important controlling factor is the volume of solution injected (*Nightingale PJ 1983*)

Patients and Methods

Eighty patients aged between 18–70 years with ASA I– II who were scheduled for peri anal fistula surgeries under spinal anaesthesia were enrolled in our study after written informed consent and approval of ethical committee. This Study was conducted in Sohag University Hospitals from August 2016 to March 2017. Patients were excluded if they had a history of Contraindication for spinal anaesthesia, as sepsis, severe coagulopathy and severe heart disease.; with spinal deformity. Patients with

B- Motor

C- blockade is assessed based D- on a *modified Bromage scale*:

ü **Grade 0** no paralysis, able to flex extended leg at hip;

ü **Grade 1** able to flex knee but not flex extended leg;

re performed every 5min after the spinal block intra-operative

history of frequent headache and backache

Patients were divided into 2 equal groups:

- (Group I) 20 patients received 8ml (0.5%) lidocaine (prepared by adding 2ml(40 mg) 2% lidocaine to 6ml sterile distilled water).

(Group II) 20 patients received 2ml lidocaine 2% (40mg)

Then we did the followings:

1- A venous access was secured using wide bore cannula and the patient was preloaded with lactated ringer solution (10 ml/kg) before the induction of the spinal anaesthesia

2- Under complete aseptic conditions, spinal anaesthesia was carried out in the sitting position, at level (L3-4 or L4-5). After a free flow of cerebrospinal fluid was confirmed, each patient received one of the coded spinal solutions (**GI or GII**).

3- Immediately after administration, the patients were turned into the lithotomy(GI) or jack-knife(GII) position

4- Patients were monitored by: Heart rate using ECG electrodes; NIBP Using NIBP Cable and Oxygen Saturation Using Pulse Oximetry. And baseline values were recorded.

5- Observations:

A- Patients were observed for onset, duration of sensory block bilaterally by using to pin prick with a short hypodermic needle

ü **Grade 2** able to move foot only;

ü **Grade 3** unable to move foot (*Biswas et al; 2002*)

These tests we

C- Intra operatively, the patients received 10 mL/Kg lactated Ringer solution. Systolic; Diastolic Blood

Pressure and Heart rate were there after every 5 min until the end of the procedure

D- Oxygen Saturation were recorded before spinal anesthesia and there after every 5 min until the end of the procedure

F- Complications: Nausea, vomiting, shivering, desaturation or hypoxemia (SpO<sub>2</sub> <90%), bradycardia and hypotension were also noticed and treated accordingly.

recorded before spinal anesthesia and  
**Statistical analysis**

The data obtained will be analyzed using statistical program for social science (SPSS).all parametric data (continuous or discrete) obtained from age, and hemodynamics variations were analyzed using student t-test. Evaluation of non parametric data (nominal or ordinal) will be analyzed using Chi square test.

## Results

There was No Statistically significant difference between hypobaric group and isobaric group as regard age or sex of patients, duration of surgery

There was statistically significant difference between group I and group II as regard Onset of sensory block, time reach to highest sensory level as (P value Significant when <0.05). As group I has faster onset of sensory block and time needed to reach highest level of sensory block. But group II has longer duration of sensory block; There was statistically significant difference between group I and group II two and four regression were more earlier in group I than group II with significant difference

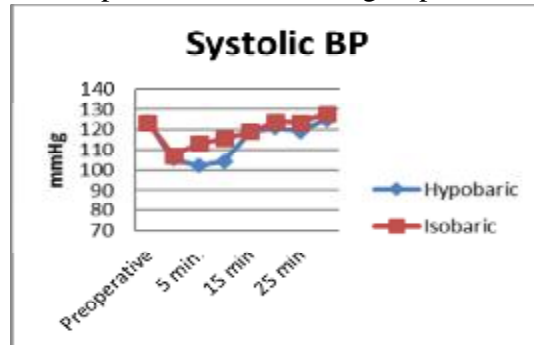
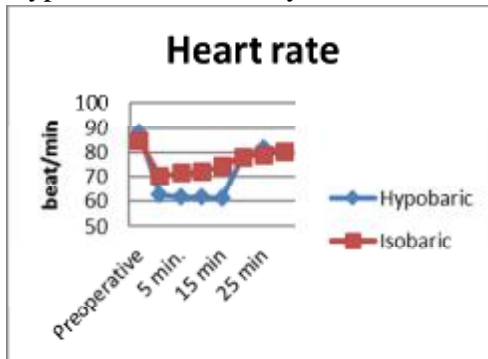
As regard as onset of motor block as group I has faster onset of motor block; but duration of motor block longer in group II. (table 1)

Variable	Group I (Hypobaric)	Group II (Isobaric)	P value
Onset of sensory block Mean ± SD	4.775±0.3432	5.200±0.251	<0.001
Time to reach highest level of sensory block(min) Mean ± SD	5.500±0.5000	6.550±0.4261	<0.001
Duration of sensory recovery(min) Mean ± SD	89.0±10.7115	187.500±13.028	<0.001
1*Two segment regression(min) 2*Four segment regression(min) Mean ± SD	1* 46.250±4.2535 2* 70.500±4.1359	1* 80.725±2.4627 2* 135.250±6.7814	1* <0.001 2* <0.001
Time to reach complete motor block(min) Mean ± SD	19.600±0.6806	29.980±1.356	<0.001
Duration of motor block(min) Mean ± SD Median (range)	93.750±4.8327	130.0±4.2920	<0.001

Comparison between group I and group II as regard sensory and motor block. (table 1)

There was statistically significant difference between group I and group II as regard heart rate and systolic blood pressure in the first 5, 10 minutes after induction. But As regard diastolic blood pressure they only significantly different at 10 minutes after induction. then there was no Statistically Significant difference;. As regard Complication

that No Significant difference Between Two groups in rate of Complications; Hypotension and Bradycardia were most frequent complications in the two groups



### DISCUSSION:

In our Study There was statistically significant difference between group I and group II as regard Onset of sensory block , time reach to highest sensory level as (P value Significant when <0.05).As group I has faster onset of sensory block and time needed to reach highest level of sensory block. But group II has longer duration of sensory block.

In agreement to our study **Imbelloni et al. (2008)** ( who compared three groups of hypobaric lidocaine (18 mg,24 mg,30 mg) in ano rectal surgical procedures) have reported rapid onset and duration of sensory block is dose dependant. He also found that 40 mg of lidocaine 1% provided full recovery in  $142 \pm 27$  min. The same dose of hypobaric lidocaine 0.5% provide a recovery time of  $151 \pm 23$  min so duration of anaesthesia was shorter in hypobaric than isobaric group.

In contrast to our study **Fettes et al. (2005)**, 9 compared in their study 15mg of plain and hyperbaric solution of lidocaine for elective perianal surgery )and found more rapid onset of sensory block with hyperbaric lidocaine than isobaric solution .

As regards highest level of sensory block we found that in group II sensory block reached to higher level T12 (25%

of patients) than group I in which sensory block not reached to T12 and only 10% of patients reached to T10& T9,and the time to reach highest level in group I was earlier than group II with significant difference.

In agreement to our study **Imbelloni et al. (2008)** noticed that The level of the sensory block was significantly different between Group1 and Groups2 and 3 at the 15 minute and end of evaluation

As regard Both two and four regression were more earlier in group I than group II with significant difference

In agreement to our study **Luiz et al (2009)** (who comparedHypobaric 0.15% Bupivacaine Versus Hypobaric 0.6% Lidocaine for Posterior Spinal Anesthesia in Outpatient Anorectal Surgery )he found that there is short recovery period (64 min) with hypo baric lidocaine

In contrast to our study **Mark N. Bodily M (1992) et al** ( who used Lidocaine 0.5% for short stay perirectal surgery) noticed that Sensory level of anaesthesia regressed two dermatome from the peak block height in  $97 \pm 36$  min which is longer than our study in which two segment regression occur in  $46.250 \pm 4.253$ .

In our Study there was statistically significant difference between group I and group II as regard as onset of motor block as group I has faster onset of motor block.;but duration of motor block longer in group II.

In agreement to our study **Imbelloni et al. (2008)** who compared three groups of different doses of hypobaric lidocain noticed that in group1(18mg)and group2(24mg)rapid motor recovery and in group 3(30 mg) only 4 need help to go to recovery room

In contrast to our study **Luiz et al (2009 )** (who compared Hypobaric 0.15% Bupivacaine Versus Hypobaric 0.6% Lidocaine for Posterior Spinal anesthesia in outpatient anorectal surgery ) noticed that grade 3 motor block according to Bromage score not observed yet which is against our study in which grade 3 is observed.

Our Study showed that No Significant difference Between Two groups in rate of Complications and Showed that group I:Hypotension 5 cases (25%) Bradycardia 2 cases (10 %)...nausea

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1case (5%) ..... vomiting 1 case (5%) ....Shivering 1case (5%).

In group II :Hypotension4 cases (20%).....Bradycardia 1case (5%).... Nausea 2 cases (10%)...Vomiting 1case (5%)..... Shivering 2case (10%).

-Hypotension treated by 6mg ephedrine and dose repeated as need; Bradycardia treated by 0.5mg atropine; Nausea and Vomiting treated by Meclopram ;Shivering treated by warming fluids and blankets.

In agreement to our study; **Imbelloni et al. (2008)** noticed that brady cardia occur with increase dose of hypobaric lidocain but noticed no hypotension.

In contrast to our study **Luiz et al (2009 )** observed hemodynamic stability with hypobaric lidocain.

## Conclusion:

The use of hybo baric lidocain reveal early onset for sensory and motor block with early recovery than isobaric and hemo dynamic stability is slight more in iso baric lidocain in short stay surgeries as perianal surgeries

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