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**COMPARISON OF SUB ARACHNOID BLOCK WITH 26/27G
SPINAL NEEDLE WITH OR WITHOUT INTRODUCER (21G
SHORT INTRODUCER NEEDLE) :PROSPECTIVE
RANDOMIZED CONTROLLED STUDY”**

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ABSTRACT:

Objective:

To Compare the ease of insertion of 26/27G spinal needle with and without short introducer (21G) needle while giving sub arachnoid block(SAB), to assess the number of attempts and the duration of procedure.

Background:

SAB is one of the commonest techniques used in anesthetic practice for obstetric patients and other infra umbilical procedures. One of it's most distressing complication is post dural puncture headache(PDPH). Smaller gauge and pencil point needles are designed to reduce PDPH. A 21G introducer needle can be used as a tool for stabilization as it allows for the

placement of a fine gauge needle of 26G/27G during SAB. Such needles are used to reduce the incidence of PDPH.

Method:

40 patients who required SAB for infra umbilical procedure were included in this randomized control study. 20 patients were randomly allotted in each group. Group A included patients requiring SAB given with an introducer needle and Group B included patients requiring SAB but without an introducer needle. The ease of insertion, number of attempts and duration of the procedures was assessed. Data was compared using Fisher's exact test.

Results:

Analysis of results revealed that while performing SAB ease of insertion was better with introducer needle ($P=0.019$, Group A 95% & Group B 60%) and there is no significant difference in number of attempts between both the groups ($P=0.069$) and no significant difference in the duration of performing SAB (mean \pm SD: 47.8 ± 9.4 group A vs 46.7 ± 10.7 group B/ $P=0.7$).

Conclusion:

The use of an introducer needle with fine gauge spinal needle for SAB was resulted in easier insertion for obstetrics and all infra umbilical surgical procedures.

INTRODUCTION:

SAB is a form of neuraxial regional anaesthesia involving the injection of local anaesthetic agents and other adjuvants into the subarachnoid space. Most commonly 26G/27G spinal needles, 9 cm (3.5 inch) in length are used. It is a safe and effective form of anaesthesia usually performed in urological, gynecological, obstetric, lower abdominal, perineal, lower limb vascular and orthopedic surgeries. It may lead to side effects such as backache, nausea, vomiting, hypothermia, hypotension and PDPH, Among which PDPH is the most distressing complication during post operative period. Hypotension is often observed complication of SAB that occurs as the sympathetic blockage, especially when higher dermatomes levels are needed¹.

With the use of smaller gauge and pencil point needles, we can reduce the risk of post operative complications of SAB. It occurs especially in mothers posted for elective or emergency caesarean sections in whom the incidence is higher than rest of the population. Increased estrogen levels in the patients affect the tone of cerebral vessels, causing vascular distension due to CSF hypotension².

The short introducer needle provides the desired level of stability and guidance for the placement of a longer and finer spinal needle that are required to reach the dural space³. We included a 21G short (0.80mm) needle that is placed into the interspinous space before placement of the spinal needle through it, in order to guide the fine gauge needle. This technique is practiced as it is more likely for the thinner spinal needle to bend during its

insertion through soft tissue & ligaments. In this study we compared various parameters such as the ease of insertion, number of attempts and the duration of procedure with and without the use of an introducer needle.

MATERIALS AND METHODS:

This Prospective randomized control study was conducted after approval of institutional ethical committee. The study was conducted in the department of anesthesiology and critical care in a tertiary level health care hospital over a period of 6 months.

Study were carried out on 40 patients that require spinal anaesthesia for an infra umbilical procedures belonging to ASA (American Society of Anaesthesiologists) I,II,III. Patients were randomised into two groups.

GroupA-SAB with introducer needle

GroupB-SAB without introducer needle

All patients who required spinal anaesthesia of either sex, American society of anaesthesiology (ASA) grade 1,II and III, patients and relatives who gave informed written consent and were willing to be a part of the study were included in the study. Patients with ASA physical status IV or more, with any neurological and psychiatric disorders and spine abnormalities, history of allergy to any of the drugs being used under study & unwilling patients were excluded from this study.

After detailed pre anaesthetic evaluation, routine and specific investigation were done, each patient was informed regarding the purpose of the study. Adequate preoperative fasting was ensured. A 20G IV cannula was secured as peripheral venous access, basic monitors like non invasive blood pressure,pulse oximetry,standard 3-lead electrocardiography(ECG) was initiated. Baseline vital parameters such as systolic blood pressure(SBP),diastolic blood pressure(DBP),SPO2 and respiratory rate were recorded and the patient was preloaded with 500ml intravenous crystalloid solution. After explaining the procedure patients were given sitting position for spinal anaesthesia.

Group A:

Performing the SAB, spinal needle along with the stylet is inserted into the introducer needle(21G) in such a way that tip of the spinal needle remains with in the introducer needle. A 21G short needle was inserted at the desired intervertebral space(L4-L5) to prevent deflection of spinal needles,decrease risk of infections and to avoid skin fragments from entering into the sub arachnoid space and to decrease the incidence of PDPH. Introducer needle was inserted in the midline and directed cranially at an angle of less than 50 degrees of the vertebral

column upto interspinous ligament, then the 26/27G was directed forward upto sub arachnoid space. The stylet was removed to observe the free flow of CSF. After obtaining the CSF flow local anaesthetic injection was injected into sub arachnoid space.

Group B:

SAB performed with 26G/27G spinal needle and without introducer needle.

Following parameters were observed,

*Ease of insertion

*No of attempts

*Duration of procedure



Fig1: Introducer needle 21G(0.80mm)



Fig 2:Spinal needle 26G

Results:

Table 1 shows ease of insertion while attempting SAB was better with introducer needle rather than without introducer needle. Statistical significance level between both the group is Table1-Group A 95% & Group B 60%, $P=0.019$.

Table 2 shows number of attempts to achieve SAB between both the groups. Statistical analysis shows that there is no significance between both the groups($P=0.069$).

Table 3 shows the total time taken while performing SAB. While comparing the mean duration between group A and group B when performing SAB, we found no significant difference between both the groups (P=0.7).

Fig. 1 Depicts ease of insertion while performing SAB among these two groups-Group A & B

Fig. 2 Depicts the total amount of time taken during SAB between two groups.

Fig. 3 Depicts the number of males and females who participated in this study.

GROUP	EASE OF INSERTION		TOTAL
	Grade-1	Grade-2	
GROUP A	19 (95%)	1 (5%)	20 (100%)
GROUP B	12 (60%)	8 (40%)	20 (100%)
TOTAL	32 (77.5%)	9 (22.5%)	20 (100%)

FISHER EXACT TEST P=0.019

*Table 1 shows ease of insertion while attempting subarachnoid block. The demographic profile was compared in all two groups.

GROUP	No# of Attempts			TOTAL
	1	2	3	
GROUP A	15(75%)	5(25%)	0(0%)	20(100%)
GROUP B	8(40%)	10(50%)	2(10%)	20(100%)
TOTAL	23(57.5%)	15(37.5%)	2(5%)	20(100%)

FISHER EXACT TEST P=0.07

* Table 2 shows no of attempts while during subarachnoid block with using introducer needle and without introducer needle.

Group	Mean	SD	95% CI Mean
Group-A	47.85	9.44	43.43 to 52.27
Group-B	46.75	10.79	42.69 to 51.80

T=0.34, df=38, P=0.73

*Table 3 shows the total time taken while performing subarachnoid block.

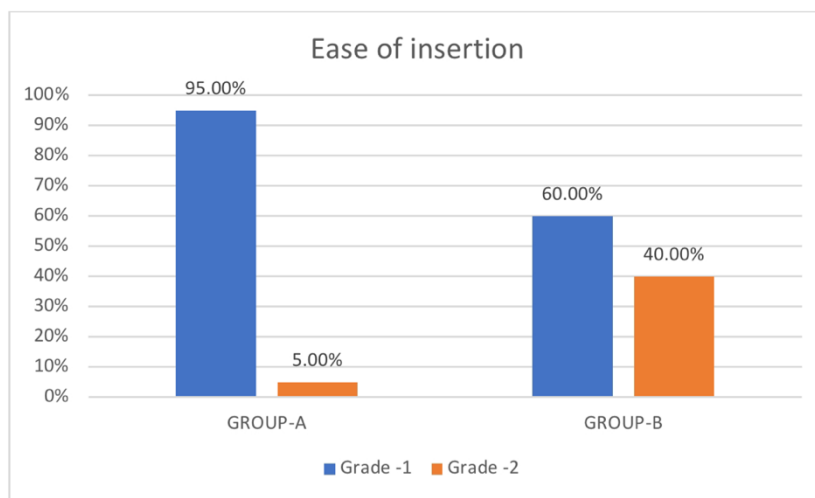


Fig. 1 depicts ease of insertion while performing subarachnoid block among these two groups-GroupA &GroupB

Time taken

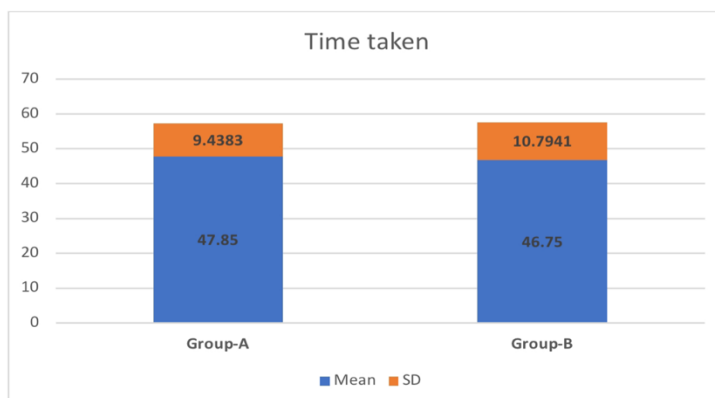


Fig. 2 depicts the total amount of time taken during subarachnoid block inbetween two groups.

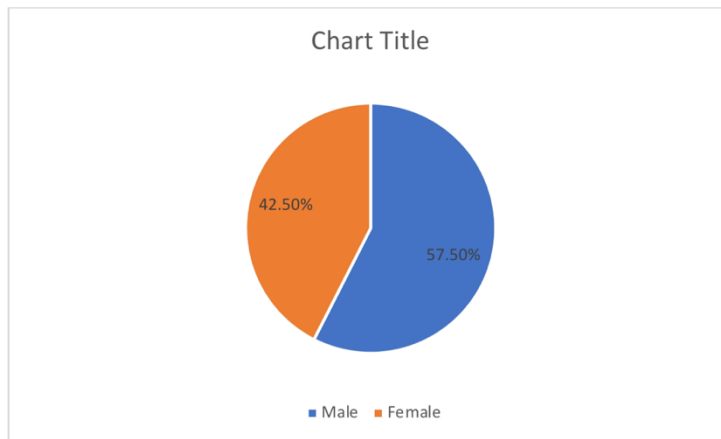


Fig. 3 depicts the no of males and females who participated in this study.

Discussion:

SAB is practiced widely by anaesthesiologist as it is a simple, cost effective technique which can provide complete sensory and motor block to perform surgeries⁶.

The rise of interest in SAB, particularly for lower segment Caesarean section and all the infra umbilical procedure has been accompanied by refinements in spinal needles. Needle design plays a vital role during spinal anaesthesia such as needle size and needle shape. Various modifications have been made to get free flowing clear cerebral spinal fluid (CSF) and to give injections with ease yet simultaneously limit dural trauma and loss of CSF.⁷

Most commonly used needles are 23G, 26G, 27G Quincke Babcock needle which is a dura cutting type of needle. Spinal anaesthesia by using extremely thin 29G or smaller needle, would increase the chance of failure and multiple unsuccessful attempts causing dural punctures would increase the risk of PDPH⁸⁻¹¹.

PDPH is a well-known iatrogenic complication and a major drawback of spinal anaesthesia. It is diagnosed by headache occurring within 5 days after lumbar puncture, and being aggravated when standing or sitting and relieved when lying flat. It results from the loss of CSF which causes an increased tension on meninges occurring by the hole created in the dura. Most of the times PDPH does not require any treatment while patients with severe headache require treatment¹²⁻¹⁵ with adequate intravenous hydration, IV caffeine, IV analgesics, epidural blood patch. Most significant modifiable risk factor to limit the occurrence of PDPH is needle size.

Quincke Babcock 26G needles have a luer lock connection on the hub, and is designed with a bevel cutting sharp tip making it easier to insert through the skin and ligaments. Smaller gauge

and pencil point needles help to identify the dura easily and are designed to reduce the chance of PDPH as they are less traumatic. The incidence of PDPH is greatest in obstetric patients² with twice the risk.

To reduce the incidence of PDPH, the usage of pencil tip and thinner spinal needles is in trend. However, an introducer is required since the thinner spinal needles do not have the rigidity and strength to traverse the tough skin and superficial ligaments, especially in elderly individuals who tend to have calcified superficial ligaments. The disadvantage of using thinner spinal needles is that the feel of 'give' on piercing the dura is not very well appreciated. Moreover, the flow of cerebrospinal fluid (CSF) in the needle tends to be slow and aspiration may not yield a typical turbulence as obtained in larger spinal needles. Also the high resistance offered by the thinner spinal needle may make it difficult, particularly for the young practitioners to detect inadvertent movement of the spinal needle during injection of the drug into subarachnoid space^{4,5}.

An introducer needle is required to stabilize the smaller gauge needle during spinal anesthesia³. Obese patients can have a large amount of soft tissue overlying their interspinous ligaments and elderly patients can have thick ligaments. Hence, a short introducer needle can be used to provide the desired level of stability and guidance for the placement of a very long spinal needle that is often required to reach the subarachnoid space.

The advantages of first-time detection of CSF free flow was good with a standard 26G spinal needle through 21G short introducer needle. It had a better ease of insertion, reduced procedure duration, caused lesser pain and discomfort to the patient, reduced needle wastage and possibly a reduction in the complications associated with misdirection of a longer needle.

Conclusion:

In this study we came to the conclusion that with the use of introducer needle (21G) for SAB with thinner spinal needle was found to be better with respect to the ease of insertion for all infraumbilical procedure.

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