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ORIGINAL ARTICLE

Choice of Needle in Spinal Anesthesia among Anesthesiologists in Teaching Hospitals of Sindh

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ABSTRACT

Aim: To determine frequency of anesthesiologists practicing pencil- point spinal needles in teaching hospitals of Sindh, Pakistan.
Study design: Cross-sectional study.
Place and Duration of Study: The Indus Hospital, Aga Khan University Hospital Karachi, Liaquat National Hospital Karachi, Civil Hospital Karachi, Jinnah Postgraduate Medical Centre (JPMC) Karachi, Sindh institute of Urology & Transplantation (SIUT) Karachi, Abbasi Shaheed Hospital Karachi, Ziauddin Hospital Karachi, PNS Shifa Hospital Karachi, Civil Hospital Hyderabad, Chandka Medical College Larkana and Peoples Medical College Nawabshah from 1st June 2018 to 30th April 2019.
Methodology: Sixty FCPS anesthesiologists or equivalent working in teaching hospitals of Sindh for more than one year, either gender and age 30-70 years were enrolled in the study. MCPS specialists were excluded.
Results: Majority anesthesiologists were males 48 (80%). The median working experience was 15 years (IQR): (10-21) with no significant difference between both the genders (mean: 17.2 vs 13.8, p=0.277). Thirty three (55.5%) had professional experience of ≥15 years. Approximately 42% belonged to Aga Khan University hospital. All participants had work experience of general surgery, while 54(90%) worked in Urology, 53(88.3%) participants had experience of Orthopedics, Gynecology and Obstetrics.
Conclusion: Although majority of consultants use 25G Pencil Point Needles for spinal anesthesia but still we need to educate more practitioner of government institutes to use smaller gauge spinal needles and the reason of using smaller gauge pencil point needles should be to prevent the chances of PDPH.
Key words: Choice, Needle, Spinal anesthesia, Teaching hospitals

INTRODUCTION

Spinal anesthesia is one of the commonest techniques used in anesthetic practice in lower abdominal and lower limb surgeries.[1] It is a safe, inexpensive and reliable technique which provides profound muscle relaxation, decreases the operative blood loss and produces excellent operating conditions. It requires minimum postoperative anesthesia care and provides adequate post-operative analgesia[2]. Post-dural puncture headache (PDPH) also known as post-spinal puncture headache (PSPH), lumbar puncture headache and spinal headache, is the most common complication associated with spinal anesthesia.[3-5] Post-dural puncture headache classically begins after 24-48 hours of spinal anesthesia administration and has potential for considerable morbidity or even death.[2,6] The overall incidence of PDPH reported by an observational study conducted in Babol University of Medical Sciences, Iran, is between 0.1-36%.[3]

There are several risk factors associated with PDPH. Among those, type of needle used, needle gauge and number of attempts are some of the modifiable factors that can reduce the incidence of PDPH.[7,8] Anesthetists have been active in attempting to reduce the incidence of PDPH[6] by modifying the needle size[1,9] and needle shape to limit dural trauma and loss of CSF.[10] Spinal needles generally in use today are 22G-27G but different sizes in the range of 19G to 30G are also available[1]. The incidences of PDPH reported with different types of needles are 40% with 22G needle, 25% with 25G needle[6], 2-12% with a 26G needle[6,10] and <2% with a 29G needle[6,11].

Among the different types of available needles, cutting needle (Quincke) has a sharp tip which cuts the dural fibers, creates a bigger hole and is associated with more CSF leakage, while pencil point needles (Whitacre/Sprotte) have a blunt tip that separates the dural fibers, creates a small dural hole and results in small leakage of CSF[7]. In terms of cost, pencil point needles are costly compared to the cutting needles[12,13].

Randomized trial have compared the incidence of post dural puncture headache (PDPH) for five types of spinal needles (two cutting needles and three pencil point needless and found that pencil point needle is a better choice in conductance of spinal anesthesia[12]. However, the evidence provided is only from limited studies and further research in this context seems mandatory. The results of this study will help providing a descriptive comparison of various needles. Consequently, help saving many lives as also prevent patients from discomfort or pain.

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MATERIALS AND METHODS

This cross-sectional study was conducted in Karachi (The Indus Hospital, Aga Khan University Hospital, Liaquat National Hospital, Civil Hospital, Jinnah Postgraduate Medical Centre (JPMC), Sindh institute of urology and transplantation (SIUT). Abbasi Shaheed Hospital, Ziauddin Hospital, and PNS Shifa Hospital), Hyderabad (Civil Hospital), Larkana (Chandka Medical College), Sukkur (Civil Hospital) and Nawabshah (Peoples Medical College) from 1st June 2018 to 30th April 2019 and 60 anesthesiologists FCPS or equivalent working in teaching hospitals were enrolled. All anesthesiologists working for more than one year in teaching hospitals of Sindh, either gender and age 30-70 years were included. MCPS specialists were excluded. Before commencing the study, an appointment was made with the Head of the Anesthesia department in each of the selected teaching hospitals of Sindh. The Principal investigator (PI) of the study met the respective head and discussed the purpose and objectives of this study. Permission was taken by the Ethical Review Board to conduct the study. After the permission, the anesthetists working in each of the teaching hospitals were approached. The eligible anesthetist was then approached on phone or in person for the verbal consent. Those consenting to participate, a day and time were decided for filling of the questionnaire. The questionnaire took 10-15 minutes. Questions regarding needle choice, needle gauge, reasons for this choice were included in the questionnaire. Percentage of anesthesiologists practicing with pencil point needle for spinal anesthesia in ASA 1 and 2 patients was computed and analyzed. Data was entered and analyzed using SPSS version 21.0. Chi square test and independent t test was applied for analysis of the results. P vale <0.05 was considered as significant.

RESULTS

Majority of the participants were male 48(80%). The median working experience of the participants was 15 years (IQR): (10-21)

with no significant difference between both the genders (mean: 17.2 vs 13.8, p=0.277). Additionally, results showed that more than half of the participants 33(55.5%) had professional experience of ≥15 years. Furthermore, approximately 42% of the study participants belonged to Main University hospital Karachi. All participants had work experience of general surgery, while 54(90%) worked in Urology, 53(88.3%) participants had experience of Orthopedics, Gynecology and Obstetrics (Table 1).

Regardless of gender and work experience three-fourth of the participants reported the use of pencil point needle for spinal epidural with higher proportion of the participants working in private institute in comparison to government institute [88.1% vs 44.4%, p= 0.001] (Table 2). Moreover, participants reported the use of pencil point needle more in gynecology and obstetrics department (p=0.028). Generally, 25 G needle was found to be the most frequently used needle for the spinal epidural (n=55; 91.7%) with no significant difference between both the genders and departments (p= 0.397, 0.651 respectively, Table 2, Fig 1). However, participants with work experience of 15 years and more and government institute reported significantly higher use of 27 G needle in comparison to those who had work experience of less than 15 years (p=0.001) [Table 3].

When the participants were asked about the reason of using particular type of needle then regardless of gender, type of institute and department majority of the participants 32(53.3%) reported availability as the major reason, followed by easy to use and less chance of PDPH (p=0.092, p=0.102 and p=0.257, Table 4). Whereas, proportion of participants with work experience of 15 years and more reported other reasons as well along with availability, easy to use and less chance of PDPH [p=0.027[(Table 4).

Table 1: Characteristics of participant (n=60)

Variable	No.	%
Age (years)	46.6±9.6	
Gender		
Male	48	80.0
Female	12	20.0
Work experience (years)		
Med (IQR)	15 (10-21)	
Departments		
General Surgery	60	100.0)
Urology	54	90.0)
Orthopedics	53	88.3%
Gynecology	53	88.3%
Obstetrics	53	88.3%

Table 2: Comparison of gender with the spinal needle type and chance of PDPH

Variable	Gender			P value
	Male	Female	Total	
Needle type frequently used				
Cutting	25 (52.1%)	2 (16.7%)	27 (45%)	0.050
Pencil point	35 (72.9%)	10 (83.3%)	45 (75%)	
Both	2 (4.2%)	2 (16.7%)	4 (6.7%)	
Needle gauge frequently used				
25 G	44 (91.7%)	11 (91.7%)	55 (91.7%)	0.397
27 G	11 (22.9%)	4 (33.3%)	15 (25%)	
Other	2 (4.2%)	2 (16.7%)	4 (6.7%)	
Reason for using particular type of needle				
Economic reason	9 (18.8%)	-	9 (15%)	0.130
Availability	29 (60.4%)	3 (25%)	32 (53.3%)	
Easy to use	17 (35.4%)	3 (25%)	20 (33.3%)	
Less chance of PDPH	10 (20.8%)	4 (33.3%)	14 (23.3%)	
Less complicated	4 (8.3%)	2 (16.7%)	6 (10%)	
Other	12 (25%)	4 (33.3%)	16 (26.7%)	
Work experience in years				
< 15	19 (39.6%)	8 (66.7%)	27 (45%)	0.092
≥15	29 (60.4%)	4 (33.3%)	33 (55%)	

Table 3: Comparison of work experience with the spinal needle type and chance of PDPH

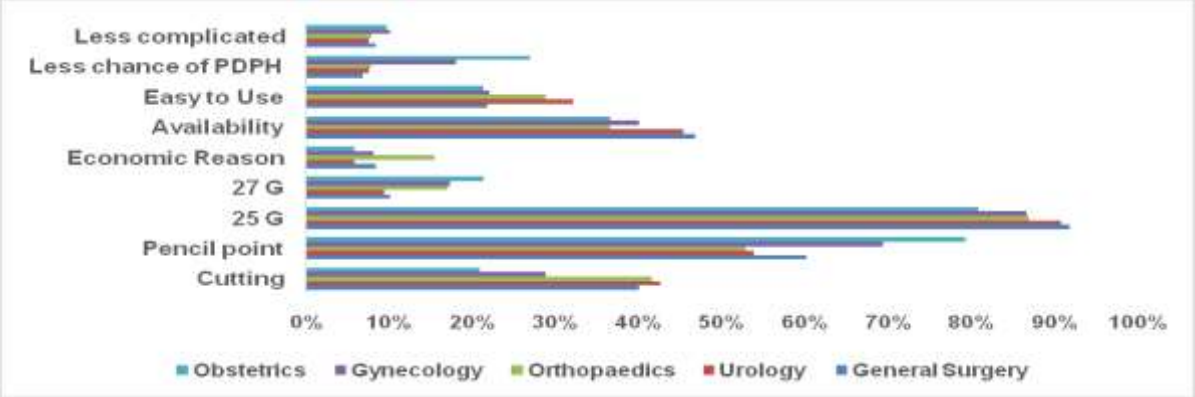
Variable	Work experience (years)			P value
	< 15	≥15	Total	
Needle type frequently used				
Cutting	11 (40.7%)	16 (48.5%)	27 (45%)	0.274
Pencil point	20 (74.1%)	25 (75.8%)	45 (75%)	
Both	-	4 (12.1%)	4 (6.7%)	
Needle gauge frequently used				
25 G	27(100)	28 (84.8%)	55 (91.7%)	0.001
27 G	2(7.4)	13 (39.4%)	15 (255)	
Other	-	4 (12.1%)	4 (6.7%)	
Reason for using particular type of needle				
Economic reason	4 (14.8%)	5 (15.2%)	9 (15%)	0.027
Availability	18 (66.7%)	14 (42.4%)	32 (53.3%)	
Easy to use	6 (22.2%)	14 (42.4%)	20 (33.3%)	
Less chance of PDPH	5 (18.5%)	9 (27.3%)	14 (23.3%)	
Less complicated	4 (14.8%)	2 (6.1%)	6 (10%)	
Other	3 (11.1%)	13 (39.4%)	16 (26.7%)	

Table 4: Comparison of type of institute with the spinal needle type and chance of PDPH

Variable	Type of Institute			P value
	Government	Private	Total	
Needle type frequently used				
Cutting	16 (88.9%)	11 (26.2%)	27 (45%)	0.000
Pencil point	8 (44.4%)	37 (88.1%)	45 (75%)	
Both	2 (11.1%)	2 (4.8%)	4 (6.7%)	
Needle gauge frequently used				
25 G	14 (77.8%)	41 (97.6%)	55 (91.7%)	0.041
27 G	6 (33.3%)	9 (21.4%)	15 (25%)	
Other	2 (11.1%)	2 (4.8%)	4 (6.7%)	
Reason for using particular type of needle				
Economic reason	5 (27.8%)	4 (9.5%)	9 (15%)	0.102

Availability	12 (66.7%)	20 (47.6%)	32 (53.3%)	
Easy to use	4 (22.2%)	16 (38.1%)	20 (33.3%)	
Less chance of PDPH	2 (11.1%)	12 (28.6%)	14 (23.3%)	
Less complicated	1 (5.6%)	5 (11.9%)	6 (10%)	
Other	3 (16.7%)	13 (31%)	16 (26.7%)	

Fig. 1: Trend of various departments towards use of spinal anesthesia needle



DISCUSSION

Spinal anesthesia blocking is safe as well as an effective way of anesthesia performed by an anesthesiologist. It can be used as an alternate of general anesthesia especially in surgical procedures involving lower extremities[14]. Literature has supported reduced pain and better management related with spinal anesthesia than general. Using spinal anesthesia decrease usage of opioids has been observed in patients with a reduced cardiovascular and pulmonary pressure[15]. It is highly important that a complete spinal nerve block will be achieved for patient proper care and safety.[16]

While performing spinal aesthesia the most significant factor is the efficiency and spinal block needle choice for delivering least painful and effective means of anesthesia to the patients.[16] Various anesthetist has different needle choices. In appropriate spinal positioning and lack of professionalism can result into various complications related to spinal anesthesia[17]. Post-dural complications have long been associated with spinal anesthesia. A constant headache appearing or worsening significantly upon assuming the upright position and resolving or improving significantly after lying down. A study reported the incidence pf PDPH as 0.1-3.6% with risk factors as type of needle used, needle gauge in addition to the number of attempts performed for provision of spinal anesthesia. Needle gauge applied in majority of the participants of the current study was 25 gauge. Studies reports incidences of PDPH as 5% with 26 G and 8.7% for cutting needles of 25G Quincke) whereas 4%, 2.8%, and 3.1% for three pencil point needles (24G GM, 24G Sprotte, 25G Whitacre) respectively[18,19].

In the present study majority of the government institute practitioners were using cutting needle while pencil needle was opted by most of the private practitioners. Cutting needles are associated with formation of large hole which causes more CSF leakage in comparison to pencil needle. Unfortunately pencil needles are costly and therefore most of the government anesthesiologists preferred the cutting needle[20].

CONCLUSION

Although majority of consultants use 25G Pencil Point Needles in private sectors for spinal anesthesia but still we need to educate more practitioner of government institutes to use smaller gauge spinal needles and the reason of using smaller gauge pencil point needles is to prevent the incidence of PDPH.

Conflict of interest: Nil

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