COMPARISON OF OBSTETRIC ANESTHESIA PRACTICES IN DIFFERENT LEVEL OF HOSPITALS ACROSS PAKISTAN

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ABSTRACT

Objective: To compare the current practices in obstetric anesthesia in different level of hospitals across Pakistan and their adherence to guidelines and standards.

Study Design: Cross sectional analytical study.

Place and Duration of Study: Department of Anesthesiology, Combined Military Hospital Okara for two months, from Dec 2018 to Feb 2019.

Material and Methods: Five hundred questionnaire were sent to Department of Anesthesiology of 100 different hospitals. The proforma was a self-administered 22-questions that asked about the various aspects of the conduct of obstetric anesthesia. The data were analyzed using SPSS version 20. The qualitative variables were presented as frequency and percentage. Chi square used to calculate significance; *p*-value ≤0.05 taken as significant.

Results: We received 311 questionnaires (62.2%) from various institutes. At the tertiary care hospital, most of respondents were aged less than 35 years and had an experience of 11-20 years as compared to 35-50 years in primary and secondary care hospitals; $p<0.01$. Although males (68.5%) make up a bulk of anesthetist, most of the females were working in tertiary care hospitals, *p*-value<0.01. Most of the obstetric anesthesia practices were comparable between the levels of hospitals. Anesthetist at tertiary care hospitals more commonly used colloid preload; a lesser volume for preload; routine left uterine tilt, prophylactic vasopressors and epidural analgesia for painless labor in obstetric anesthesia practices, $p<0.05$.

Conclusion: Most the obstetric anesthesia practices were comparable between the three levels of hospital. These are in accordance with the latest guidelines by international societies.

Keywords: Epidural for painless labor, Local anesthetic dose, Obstetric anesthesia, Prophylactic vasopressor, Spinal anesthesia.

INTRODUCTION

The maternal mortality rate has reduced by 57% from 400 to 170 per 100,000 live birth in Pakistan over a period of 15 years[1]. The maternal mortality is due to multiple factors including poverty, nutritional deficiencies, lower literacy rates, early age marriage and child bearing, obstetric complications and poor reproductive healthcare services and infrastructure[2,3]. World Health Organization had set target of 75% reduction in maternal mortality by 2015; which were not met by most countries including Pakistan. The maternal and peri-natal outcomes can be improved by reducing the "third delay" in maternal health care. In this regards, obstetric anesthesia presents a unique challenge to the anesthetist, especially in low resource settings. According to studies, anesthesia complications account for up to 11% of maternal deaths[4-7]. International practice guidelines for obstetric anesthesia are regularly updated by various societies[8,9]. However, no current local or regional guidelines exist for obstetric anesthesia. In addition, there may exist a discrepancy in the adherence to guidelines set forth by the European or American societies, between the tertiary, secondary and primary level hospitals. According to the authors' knowledge limited data is available regarding the current practices in the perioperative anesthesia conduct in obstetric

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patients in Pakistan. We conducted this study to assess the current practices in obstetric anesthesia in different levels of hospitals in Pakistan and their adherence to guidelines and standards.

PATIENTS AND METHODS

After the approval of the hospital ethical committee, this cross sectional analytical study was conducted over a period of 2 months, from 15th December, 2018 to 15th February 2019. A total of 500 questionnaires were mailed to the anesthetists of 100 hospitals by postal services as well as online form on social media. The hospital were selected by random, lottery method to include teaching hospitals as well as peripheral hospitals. These included armed forces hospitals, public sector (government) as well as private hospitals. Primary care level hospitals included Class DEE military hospitals and Tehsil Headquarter Hospitals; Secondary level hospitals included class BEE and CEE military hospitals and District Headquarter Hospitals whereas tertiary level hospital included class AYE military hospitals and all other civilian teaching hospitals. The demographic profile included the gender, age and experience in obstetric anesthesia, qualification of the anesthetist and level of hospital. The questionnaire was a 22 point, self-administered questions regarding the various aspects of the conduct of obstetric anesthesia including: Choice of anesthesia, fluid administered, vasopressor. All the participants were given a cut-off date for return of proforma.

The data were analyzed using SPSS version 20. The descriptive values were presented as mean and SD. The qualitative variables were presented as frequency and percentage. Chi square and Fischer exact test weres used to calculate significance; *p*-value ≤0.05 was taken as statistically significant.

RESULTS

A total of 500 porforma were dispatched by postal mail or online form. We received 311 porforma (62.2%) back: 261 (59.3%) by post and 50 (83.3%) by online forms. Most four respondents were male 213 (68.5%). The mean age of our study population was 40.1 years ± 10.0 yrs. Most of responders were from tertiary care 225 (72%) followed by secondary care, shown in fig-1.

The distribution and comparison of qualification, experience and gender in the three level of hospitals is given as table-I.

Spinal anesthesia 284 (91.3%) was most commonly employed for lower section cesarean section (LSCS) across all three level of hospitals and general anesthesia 3 (1%). General anesthesia was the anesthesia of choice for severe pre-ecclampsia and eclampsia, 213 (68.5%). However, anticipated or ongoing maternal hemorrhage 142

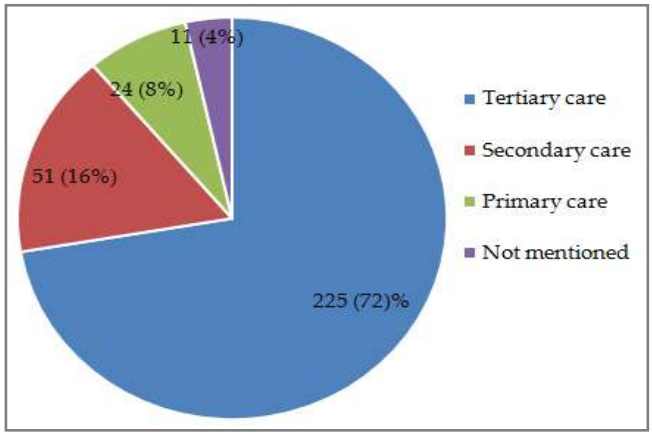

Figure-1: Level of hospitals in survey.

(45.7%) was the most common indication for general anesthesia in LSCS delivery. The choice of anesthesia and indications according to the level of hospital is shown as table-II.

Lactated ringers was the most commonly used fluid for prevention of maternal hypotension in all three levels: 16 (5.1%), 39 (12.5%) and 167 (53.7%) in primary secondary and tertiary levels. However, 51 (16.4%) in tertiary care used colloid, whereas 1 (0.3%) in primary and 7 (2.3%) in secondary care. Normal saline was used by 6 (1.9%), 5 (1.6%) and 6 (1.9%) in primary, secondary and tertiary level hospital; *p*-value<0.01. A fluid preload of 100-1500ml was more commonly used in primary level versus 500-1000ml in secondary and tertiary care

hospital, *p*-value<0.01. The fluid management is tabulated as table-III.

A total of 211 (67.8%) respondents routinely provide oxygen supplementation to mother during LSCS. There was no difference in oxygen supplementation in three level of hospital (66.7%, 76.5% and 66.7%) in primary, secondary and tertiary levels respectively); *p*=0.775. Overall, 163 (52.4%) respondents routinely used left uterine tilt by a wedge under right hip for prevention of aorto-caval compression. 132 (58.7%) of anesthetist at tertiary care level use left uterine tilt versus 37.5% in primary and 37.3% in secondary level; *p*-value=0.005. Trendelenburg position after spinal anesthesia was not used by 126 (40.5%) of anesthetist. The comparison of use of trendelenburg position after spinal anesthesia is presented as fig-2.

Only 22 (7.1%) of anesthetist providing obstetric anesthesia routinely use prophylactic vasopressors for prevention of maternal hypotension after spinal anesthesia for LSCS, with 23 (7.4%) using it occasionally and 54 (17.4%) didn't answer. Out of these 22 anesthetists, prophylactic vasopressors were most commonly used at tertiary care setting 17 (77.3%) than either secondary 2 (9.1%) or primary level 2 (9.1%), *p*=0.017. Phenylephrine was the commonly used vasopressor for prevention of maternal hypotension by 201 anesthetist (64.6%) after spinal anesthesia for LSCS, followed by ephedrine 41 (31.2%), other vasopressor by 3 anesthetist (0.9%) and no-response 34 (10.9%).

Table-I: The demographic profile of study groups.

Variable		Primary care	Secondary care	Tertiary care	*p*-value
Gender	Male	22 (7.1%)	41 (13.2%)	144 (46.3%)	<0.01
	Female	1 (0.3%)	8 (2.6%)	69 (22.2%)	
Age (years)	<35	3 (1.0%)	12 (3.9%)	73 (23.5%)	<0.01
	36-50	13 (4.2%)	24 (7.7%)	54 (17.4%)	
	51-60	1 (1.0%)	6 (1.9%)	21 (6.8%)	
	>61	-	1 (1.0%)	4 (1.3%)	
Qualification	FCPS	9 (2.9%)	12 (3.9%)	77 (24.8%)	0.382
	MCPS	4 (1.3%)	14 (4.5%)	45 (14.5%)	
	Both	2 (0.6%)	2 (0.6%)	14 (4.5%)	
	others	6 (1.9%)	14 (4.5%)	43 (13.8%)	
Experience (years)	<5	2 (0.6%)	13 (4.2%)	91 (29.3%)	<0.01
	6-10	10 (3.2%)	16 (5.1%)	47 (15.1%)	
	11-20	8 (2.6%)	17 (5.5%)	44 (14.1%)	
	>21	(1.3%)	5 (1.6%)	43 (13.8%)	

Table-II: The distribution of choice of anesthesia in study.

Variable		Primary care	Secondary care	Tertiary care	*p*-value
Choice of anesthesia	SA	23 (7.4%)	44 (14.1%)	207 (66.6%)	0.796
	GA	1 (0.3%)	1 (0.3%)	1 (0.3%)	
	Patient choice	-	5 (1.6%)	14 (4.5%)	
	Others	-	-	1 (0.3%)	
Anesthesia for Pre-ecclampsia / Eccalmpsia	SA	6 (1.9%)	12 (3.9%)	61 (19.6%)	0.048
	GA	15 (4.8%)	37 (11.9%)	156 (50.2%)	
	CSE	-	1 (0.3%)	5 (1.6%)	
Indication for GA	APH	10 (3.2%)	17 (5.5%)	111 (35.7%)	0.440
	Eclampsia	5 (1.6%)	20 (6.7%)	51 (16.4%)	
	others	4 (1.2%)	6 (1.9%)	21 (6.7%)	

Similarly, 230 (73.9%) anesthetist used phenylephrine for treatment for maternal hypotension, followed by ephedrine 51 (16.4%), adrenaline 3 (0.9%), noradrenaline 1 (0.3%) and no answer 20 (6.4%). Phenylephrine was used most commonly as 50-100 microgram bolus by 88 respondents (28.3%), whereas ephedrine was used most commonly as 5-10 mg bolus by 22 anesthetists (7.1%).

three levels of hospitals, gender, experience and age. There were no difference in level of qualification between the three levels of hospital.

Table-III: Fluid management for prevention of maternal hypotension.

Question asked		Primary level	Secondary level	Tertiary Level	*p*-value
Preferred time for fluid for prevention of maternal hypotension	Weight based Preload	7 (2.3%)	11 (3.5%)	60 (19.3%)	0.689
	Volume based preload	14 (4.5%)	22 (7.1%)	99 (31.8%)	
	Co-load	2 (0.6%)	3 (1%)	6 (1.9%)	
The average time for preload	Up to 10 minutes	4 (1.3%)	6 (1.9%)	18 (5.8%)	0.161
	11-20 minutes	2 (0.6%)	6 (1.9%)	33 (10.6%)	
	21-30 minutes	7 (2.3%)	6 (1.9%)	18 (5.8%)	
	>31 minutes	-	1 (0.3%)	2 (0.6%)	
Volume of fluid used for preload	Up to 500 ml	5 (1.6%)	8 (2.6%)	27 (8.7%)	<0.01
	500-1000ml	13 (4.2%)	13 (4.2%)	78 (25.1%)	
	1000-1500ml	1 (0.3%)	-	1 (0.3%)	
	>1500 ml	-	1 (0.3)	-	
The volume of fluid for weight based preload	Up to 10 ml/kg	3 (1%)	8 (2.6%)	151 (48.6%)	0.418
	11-20 ml/kg	-	2 (0.6%)	32 (10.3%)	
	21-30 ml/kg	-	1 (0.3%)	4 (1.3%)	
	> 31 ml/kg	1 (0.3%)	-	2 (0.6%)	

Our study found spinal anesthesia most commonly employed method for anesthesia for cesarean section; antepartum hemorrhage as the most common indication for general anesthesia; with routine oxygen supplementation; ringer

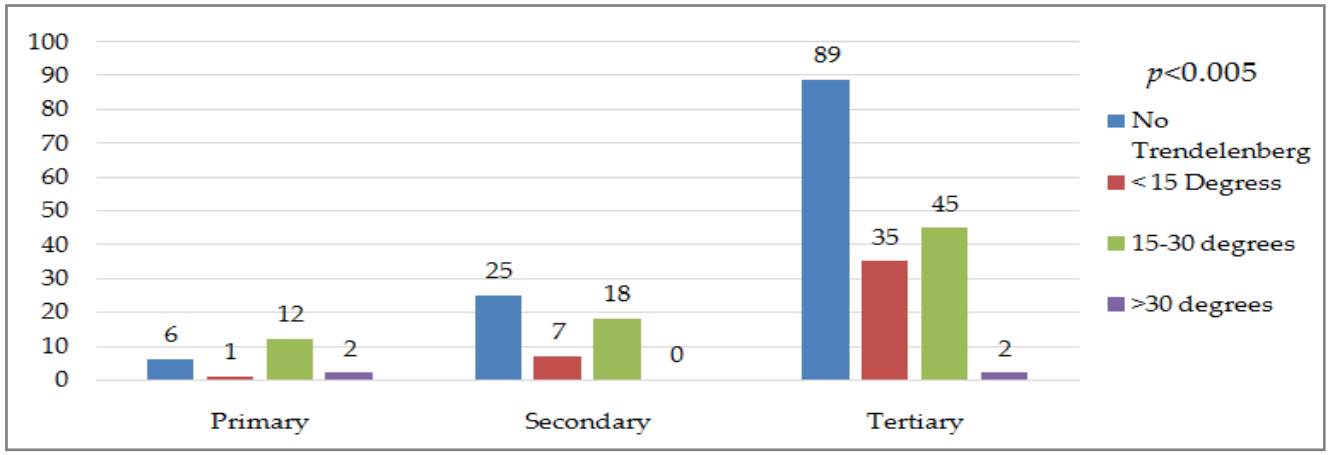

Figure-2: The distribution of use of trendelenburg position in study group.

(7.1%).

DISCUSSION

Our study has shown that there was a statistical difference in skilled manpower at the lactate being most commonly used fluid and volume based preload being most common method for prevention of maternal hypotension and reduced dose of hyperbaric local anesthetic alone being most common practice for

subarachnoid block in all the three levels. However, anesthetist at tertiary care hospitals more commonly used colloid preload; a lesser volume for preload; routine left uterine tilt, prophylactic vasopressors and epidural analgesia for painless laborin obstetric anesthesia practices. Most of these practices are in line with the latest guidelines and recommendations of the international societies. However, maternal mortality remains high in Pakistan; and it has not yet met the WHO Millennium Development Goals target of a 75% reduction in the global MMR by 2015. The Ending Preventing Maternal Mortality (EPMM) strategy also include a systemic approach to implement evidence based protocol, guidelines and standards for improved maternal outcomes as well as to monitor and evaluate progress[10]. The need of the hour is to assess the current obstetric practices; to maintain a regular update in changes in practices and exam if these are in accordance with international guidelines. In addition, we require development of guidelines for our own region keeping in mind our limited resources and immature medical infrastructure.

Several authors have reported a high trend of utilization of neuroaxial anesthesia for deliveries up to 70% of parturient[11,12]. This trend correlates with the guidelines set forth by the society of anesthesiology in America and European[8,9,13]. A systemic review and meta-analysis of maternal mortality in low and middle-income countries has shown the anesthesia related deaths to account for 2.8% of maternal mortality. General anesthesia had a higher odds ratio (OR) of 3.3 (1.2-9.0) maternal and OR 2.3 (1.2-4.1) for perinatal deaths as compared to neuro-axial anesthesia. The maternal mortality was higher in setting with obstetric anesthesia management by non-physician anesthetist as compared to physician anesthetists (9.8 versus 5.2 per 1000 anesthetics)[14]. 221 (71.1%) of our respondents used fluid preload to prevent maternal hypotension. International Guidelines recommend either preload or co-load for prevention of maternal hypotension; while not delaying initiation of spinal anesthesia waiting for preload. However, studies have been done to assess the utility of crystalloid preloading versus co-loading as well as colloid versus crystalloid preloading with unequivocal results[15-17].

Only a minority of our respondents 22 (7.1%) used prophylactic vasopressors for post spinal maternal hypotension and most these anesthetists 17 (77.1%) were from tertiary care setting. Latest guidelines do not prefer pheny-lephrine or ephedrine. However, most of the respondents 201 (64.6%) preferred phenyle-phrine for both prophylaxis and treatment of maternal hypotension. Amer *et al* also reported phenylephrine being more commonly used inotrope in District and Tehsil Headquarter hospitals of Punjab[18]. The use of phenylephrine more commonly in Pakistan may be due to two reasons. Firstly, phenylephrine is more easily available as compared to ephedrine. Secondly, it has been shown to be safer in pregnant women with maternal and neonatal outcome as well as physician interventions[19-21]. Staikou *et al*. reported ephedrine (36.4%) to be more commonly used for treatment of maternal hypotension and only 22.8% using prophylactic vasopressors[12]. Most of our respondents didn't specify the dose of vasopressor used. However, 50-100 microgram of phenylephrine and 5-10 mg ephedrine were most commonly used doses of vasopressors for treatment of maternal hypotension. Similar doses of <50 microgram phenylephrine (32.8%) and <10 mg ephedrine (47.2%) reported by Staikou *et al*[12]. Routine oxygen supplementation has been reported to be commonly used by us as well as European study[12].

Most of our anesthetist reported using local anesthetic alone at concentration of 0.75% hyperbaric bupivacaine most commonly used at the dose of 1.2mg (1.6ml). Latest guidelines recommend that opioid may be added to local anesthetic for subarachnoid as well as epidural injections. This may be due to the lack of training, experience in use of intrathecal adjuvant or non-availability of preservative free adjuvant at most hospitals.

Our study had certain limitations. We were not able to conduct a study on some of the aspects of perioperative anesthesia care including use of pencil point needle, mode and dose of postoperative analgesia; the availability of adequately trained manpower or the infrastructure of various hospitals. The reluctance/non-compliance with returning our questionnaire porforma of our researchmay have led us to miss a few major teaching hospitals.

CONCLUSION

Spinal anesthesia for lower segment cesarean section; preloading with lactated ringers solution; lower dose hyperbaric bupivacaine intrathecally; routine intra-operative oxygen supplementation and left uterine tilt are more commonly practiced in obstetrics. These are in accordance with the latest guidelines by international societies.

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RECOMMENDATION

We recommend a regular (5 or 10 yearly) quality assessment survey to assess the ongoing obstetric anesthesia practices and their adherence to international standard of care. Secondly, we recommend development of our local /regional guidelines that incorporate anesthesia conduct in our low resource setting / remote location.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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