

Scenario of General Anesthesia for Caesarean Section in Rural Tertiary Care Center in High Altitude Karnali Academy of Health Sciences

Bhattarai Ramesh,¹ Shah Rajiv,² Dhakal Sita,³ Malla Pragya,⁴ Sapkota Srijana⁵

¹Department of Anesthesia and Critical Care, ²Department of Gynaecology and Obstetrics, Karnali Academy of Health Sciences, Jumla, Nepal, ³Department of Nursing, Universal Medical College, Bhairahawa, ⁴Department of Biochemistry, Nepal Medical College and Teaching Hospital, Kathmandu, ⁵Department of Emergency, Everest Hospital, Baneshwor Kathmandu.

ABSTRACT

Background: With better safety profile of regional anesthesia, general anesthesia for cesarean section has limited indications. The aim of the study is to assess the trends indications, clinical outcome of general anesthesia in mother and fetus in high altitude setting of tertiary care center of Nepal.

Methods: We conducted descriptive cross-sectional study all cases of cesarean section in Karnali Academy of health Sciences (KAHS) located at high altitude over three years period. Data were retrieved from the hospital records for three years. . The record of all the patients who underwent cesarean section under general anesthesia was reviewed for demographic details, indication, trends of general anesthesia and regional anesthesia, and maternal and neonatal outcome.

Results: Out of total deliveries 2175, 309 (14.2%) cases account for cesarean section. Among them, 52 (17%) required general anesthesia . Eclampsia 19(36%) is the major indication for General Anesthesia in cesarean section followed by failure of spinal anesthesia number 14 (26%) , cord prolapse six (12%), antepartum haemorrhage 5 (10%), spinal site infection 4 (8%), Kyphoscoliosis 2 (4%), Patients request 2 (4%). Use for general anesthesia technique was consistent for three years with slow rise in use of spinal anesthesia. There was no any anesthesia related maternal mortality however with nine neonatal deaths intraoperatively.

Conclusions: General anesthesia practices are consistently required in rural high-altitude setup and have specific indications. Eclampsia is the commonest indication followed by failure of spinal anesthesia and cord prolapse. Neonatal outcome are still poor.

Keywords: caesarean section; general anesthesia; remote high altitude.

INTRODUCTION

Cesarean section is one of the major surgery perform routinely at many health care setup and requirement can be more at high altitude where hypoxia related complication can make pregnancy related complication more evident. Providing any form anesthesia for cesarean section is challenging due to physiological changes in maternal hemodynamics and difficult airway issues.¹ Since, 1980s regional anesthesia is more popular² for cesarean section due to high morbidity and mortality related with general anesthesia,³ potential complications related with maternal airway and neonatal exposure to drugs that being provided to mother during induction and maintenance of general anesthesia.⁴ Spinal anesthesia is more popular as it more cheap,⁵ easy to perform and less expertise required with minimum complications.⁶

Even at high altitude setups, we routinely practice spinal anesthesia as choice of anesthesia for cesarean section but general anesthesia is some time inevitable⁷ due to maternal and neonatal

indications.⁸ General anesthesia is more challenging in high altitude⁹ due to decrease of fraction of oxygen with increasing altitude, challenges in use of gaseous agents in low pressure environment. In obstetric, general anesthesia has potential complications³ and even with high altitude incidences of hypoxic injuries will be high due to decrease fraction of oxygen and decrease function reserve of oxygen in pregnancy.¹⁰ The aim of the study is to assess the trends of general anesthesia use, its major indications, clinical outcome in mother and fetus in high altitude setting of tertiary care center of Nepal.

METHODS

This was descriptive cross-sectional study done for three years period (January 1st 2017 to December 31st 2019)of time in Karnali Academy of Health Sciences (KAHS) located in remote hilly district of Nepal at an altitude of approximately 2600 meters. Hospital records were evaluated in relation to demographic data, trends in indication

Correspondence: Dr. Ramesh Bhattarai, Department of Anesthesia and Critical Care, Karnali Academy of Health Sciences, Jumla, Nepal. **Email:** ramesh327@gmail.com. **Phone:** +977-9851137284. **Article Received:** 2020-04-17. **Article Accepted:** 2020-08-24.

of general anesthesia in patients undergoing going cesarean section and maternal and fetal outcome for three years period. Consent for the study was given by ethical review board of KAHS. All patients who presented to our center and underwent cesarean section and requiring general anesthesia, their records were examined. Record was retrieved and filled in pre designed form to record age, indication for general anesthesia, and trends of three years for general anesthesia and regional anesthesia practices, immediate neonatal and maternal outcome. All the patients who require induction with intravenous anesthetic agents and airway managed with Endotracheal intubation and mechanical ventilation were included in the study. Patients who required intravenous sedation due to inadequate analgesia are excluded from the study. Data were screened for adequacy in the chart and excluded if incomplete and confusing. Each patients data entered into the Microsoft Excel 2010. Data was analyzed using Microsoft Excel 2010 and presented as percentage and

frequencies. The results were compared with data for each year for three consecutive.

RESULTS

Total number of deliveries in this three years period was 2175, among them 309 (14.2%) required cesarean section. In these cases most of were managed with regional anesthesia and 52 (16.8%) required general anesthesia. There is increase in incidence of cesarean section but the requirement of general anesthesia in cesarean section is slightly decreasing in consecutive years and appears to be consistent.

Most of the patients 32 (61%) were from 18 to 35 years age group and few were 16 (31%) from less than 18 years age group and very few 4 (8%) from more than 35 years of age. Indication of general anesthesia (GA) in cesarean section was mostly for contraindication of regional anesthesia which included emergency situation for eclampsia 19

Table 1. Age distribution of patients who require general anesthesia for cesarean section.

Age	Number	Percentage
<18 years	16	31%
18-35 years	32	61%
>35 years	4	8%

Table 2. Indication of general anesthesia for cesarean section.

Indication for General Anesthesia	Numbers(%)	Elective (%)	Emergency (%)
Eclampsia	19 (36)	0 (0)	19 (44)
Failure of regional anesthesia	14 (26)	6 (67%)	8 (19)
Cord prolapse	6(12)	0 (0)	6 (14)
Antepartapum haemorrhage	5(10)	0 (0)	7 (16)
Infection at site of spinal anesthesia	4 (8)	1 (11)	1 (2)
Khyphoscoliosis	2 (4)	1 (11)	1 (2)
Patients request	2(4)	1 (11)	1 (2)
Total	52 (100%)	9 (100%)	43 (100)

Table 3. Maternal and fetal outcome in patients with general anesthesia for cesarean section

Age	Yes	No
Maternal mortality	0	52
Neonatal mortality	9	43

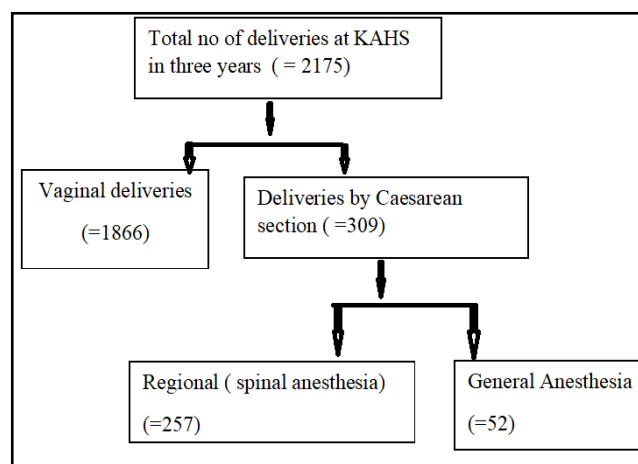


Fig 1. Flow chart of mode of deliveries for three years and technique of anaesthesia.

(36%) with decrease conscious level or focal neurological sign. Failure of spinal anesthesia 14 (26%) is second leading indication of general anesthesia which is decreased in second and third year than in first year. Other indication was emergency situation where we do not have time for regional anesthesia that include cord prolapse 6 (12%) and severe antepartum haemorrhage 5 (10%). There were very few cases where patient denied general anesthesia and made request 2 (4%) for general anesthesia for cesarean section. Four (8%) routine cases were infection at spinal anesthesia site number and severe khypho-scoliosis two (4%).

There were no any anesthesia related maternal mortality in these three years. Neonatal outcome

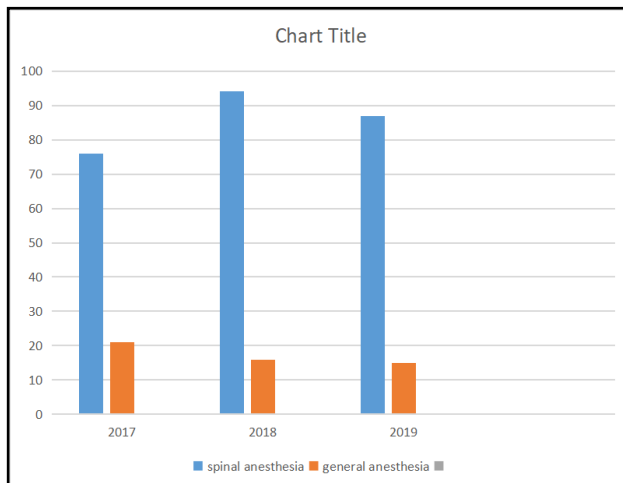


Fig 3. Spinal anesthesia and general anesthesia trend in three years.

recorded found intraoperative death of fetus with nine cases. Most of neonatal mortality was in cases of eclampsia, antepartum haemorrhage and cord prolapse.

DISCUSSION

General anesthesia still has its own place despite use of regional anesthesia being safe and practiced worldwide extensively¹¹. In our institute we practice spinal anesthesia as routine for anesthesia for cesarean section. In our study the requirement of general anesthesia is (16%) which is quite high in number than in the study by Garry et al.¹² The reason behind the disparity may be the result is the high failure rate of spinal anesthesia in high altitude which are usually less than 1 % in their study. Moreover, the incidence of eclampsia is high in high altitude mainly due to poor antenatal care, low education status and difficult access to proper health care with difficult geography.¹³ Most of pregnant have tendency to present late with complication making use of regional anesthesia requiring conversion, change in neurological status due to pregnancy related condition which might get aggravated in hypoxic state at high altitude.

Eclampsia remain the major indication for general anesthesia in cesarean section in our study as the incidence of Pregnancy induced hypertension (PIH) is high in rising altitude.¹⁴ PIH not managed properly will lead to increase incidence of eclampsia. Failure of spinal anesthesia is another major cause for general anesthesia for cesarean section in this study. The cause of regional anesthesia failure was not identified due to insufficient patient anesthesia records. But the incidence of failure of spinal anesthesia seems less in last year

than in previous year, this shows the gaining expertise of anesthesia assistant on spinal anesthesia may be the reason for the result. Probably change in cerebrospinal fluid hemodynamics due to low pressure at high altitude may be a additional reason for more failure rate. All the cases with failure of spinal anesthesia were managed with rapid sequence induction and intubation, and maintenance with inhalational anesthetic agents.

In our study the requirement of general anesthesia is greater in 18 to 35 years age group as most of patients of pregnancy and patients requiring cesarean section in this group.¹⁵ Also the patients less than 18 years are also significant requiring general anesthesia. There are high incidences of teen age pregnancy in Karnali region.¹⁶ One postoperative mortality in last three years after cesarean section in 3rd postoperative day due to eclampsia complications was recorded. There was also one difficult airway situation where we have to do surgical airway in an eclampsia patient which was managed successfully with no mortality. Poor neonatal outcome in three years period may be related to late presentation of pregnant mother which might get aggravated due to hypoxic state in high altitude. Vitus Okwuchukwu¹⁷ et al shows no any difference in maternal and neonatal out come but in our study neonatal outcome is poor. It might be due to different factors like high altitude and hypoxia, unavailability of NICU and late presentation at hospital.

The study only shows the trends of general anesthesia in high altitudes. It is a difficult task to retrieve records of this kinds as there are only few facilities around the world who provide facilities of same kind. Case numbers are expected to be low to reach a conclusion in this setting and most of the case can be confusing to evaluate due to hypoxia related complication. More data and robust study can give a much clearer idea.

CONCLUSIONS

At high altitudes, cesarean section requiring general anesthesia are common not only due to maternal indication but due to complex physiology related to hypoxia. Late presentation with pregnancy related complications, with with more tendency for failure of regional anesthesia might precluding use of general anesthesia technique consistently. Neonatal outcomes however are still poor may be related to late presentation and poor antenatal care. More studies are required to understand the complex physiological nature of maternal and neonatal outcome and use of this general anesthesia technique in high altitude.

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