

LOWER SEGMENT CESAREAN SECTION FOR GUILLAIN- BARRE SYNDROME - A NOVEL ANAESTHETIC TECHNIQUE

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ABSTRACT

Introduction

Guillain Barre Syndrome in pregnant ladies, undergoing cesarean section, has not yet reported in Nepal. Anaesthetic management of 15 patients with Guillain Barre Syndrome who underwent lower segment cesarean section at Nobel Medical College Teaching Hospital is reported here.

Objective

The purpose of this study is to assess the benefits of Rectus sheath nerve block along with infiltration of retro pubic space of Retzius in Guillain Barre syndrome patients planned for lower segment cesarean section (LSCS).

Methodology

During the period from 1st August 2015 to 31st April 2020 at NMCTH, a retrospective descriptive analysis of 15 pregnant ladies with Guillain Barre Syndrome who underwent lower segment cesarean section under Rectus sheath nerve block along with Retro pubic space of Retzius, infiltration and visceral peritoneum infiltration is discussed.

Result

Considering Surgeons opinion about the operating conditions like Relaxation, Straining, Coughing, Bucking, Satisfactory to good operative conditions were reported. Excellent to good satisfaction was expressed by 39.9% of patients, 60% patients reported satisfactory. Hypotension and Arrhythmias was seen in 2 patients. Diaphoresis was seen in 1 patient. Fetomaternal outcome was good. There was no mortality.

Conclusion

Rectus sheath block along with infiltration of retro pubic space of Retzius block can be considered as a good alternative to general anaesthesia or neuraxial block incase where general anesthesia & neuraxial block is risky or contraindicated for lower segment cesarean section in patients with Guillain Barre Syndrome.

KEY WORDS

Guillain- Barre syndrome, cesarean section, mortality, rectus sheath nerve block



INTRODUCTION

Guillain Barre Syndrome (GBS), also known as Acute idiopathic polyneuritis is now considered to be a collection of diverse disorders with several clinical manifestations, and not simply, as it was first described, "syndrome of symmetric rapidly progressing flaccid paralysis and a reflexia".^{1,2} Mostly it is characterized by the sudden onset of weakness or paralysis that typically manifests in the legs and then spreads cephalad and involves skeletal muscles of the arms, trunk and head. Autonomic dysfunction occurs in about 60% patients. Cranial nerve involvement occurs in 50%. Bulbar function and muscles of mastication are affected in greater than 30% and Ocular muscles in more than 10% of patients. All these involvement manifest as bilateral facial paralysis. Intercostals paralysis gives rise to difficulty in swallowing and impaired respiration which may be life threatening and needs endo-tracheal intubation and artificial ventilation. Of late demyelination, 'Channelopathies' have also been identified.³ Because of lower motor involvement paralysis is preceded by paresthesia in the distal part of the extremities. Headache, Backache and tenderness of skeletal muscles on deep pressure is a common accompaniment.⁴ More than 60% of patients develop autonomic nervous system dysfunctions which is the most prominent cause of catastrophic in such patients particularly in those undergoing anaesthesia and surgery. This is because of wide fluctuation of blood pressure, sudden profuse diaphoresis, peripheral vasoconstriction, resting tachycardia, sudden severe orthostatic hypotension and cardiac conduction abnormalities leading to sudden cardiac arrest.⁵ Such patients also exhibit an exaggerated response to sympathomimetics. Even asystole has been reported after eyeball surgery, carotid sinus massage and tracheal suction.^{5,6} Deaths are usually due to respiratory or autonomic dysfunction. A sodium channel blocking factor has been detected in the CSF of patients with Guillain Barre Syndrome which according to many could contribute to the paralysis.^{7,8,9} There is a strong evidence for an association between Guillain Barre Syndrome (GBS) and certain infectious like respiratory and gastrointestinal viral origin. The antigens secreted by these pathogens target the nerve fibers by initiating an immune response.^{3,5,6-9}

Guillain Barre Syndrome (GBS) is not uncommon and has an incidence of 4 in 10,000, but less reported in pregnancy because of its sudden onset, diagnostic dilemma and its resemblance to features of normal pregnancy.¹⁰ During pregnancy it can occur in all trimesters. But its occurrence in third trimester is a great threat due to high maternal risk, premature labor and respiratory complications.¹⁰ Recurrence in subsequent pregnancies are common and sometimes the disease process starts in post-partum period. As pregnancy advances towards terms the conditions worsens.

The problem of anaesthetizing a pregnant lady with Guillain Barre syndrome get compounded because of the peculiar pathophysiology of the disease and diagnostic dilemma leading to unpredictable outcome irrespective of the commonly used standard technique of anaesthesia like

neuraxial block or general anaesthesia. Literature search or pub med search did not reveal of conducting lower segment cesarean section with guillain barre syndrome patients under Rectus sheath block, first used for surgery by Carl Ludwig Schleich in 1899 and first used for lower segment cesarean section by A. C Beck in 1947 with addition of infiltration of space of Retzius and line of incision up to visceral peritoneum supplemented with 0.25% injection thiopentone sodium just before the uterus is incised. Beck's technique was thoroughly discussed at the Royal Society of medicine (anaesthesia section) in the same year in 1947 and the society recommended this technique provided the patients agreed. This issue was raised again in the Royal society meeting in 1957 and 1962. On both occasion Royal society again gave the same recommendation. According to the literature and our previous experience of complications of neuraxial blocks lead us to thought of giving a trial with Beck's technique for lower segment cesarean section with Guillain Barre Syndrome.

To anaesthetize a patient with Guillain Barre Syndrome (GBS) is a real challenge for the anaesthesiologists. Problems get compounded if the patient is pregnant as there is no other speciality in medical science where two lives are involved in one patient. It will not be out of place here to mention that general consensus in such cases is that mother's life is the first priority. There is a strong possibility that such pregnant lady with Guillain Barre Syndrome (GBS) after general anaesthesia for LSCS lands to ICU/CCU for ventilator therapy with its potential hazards. Neuraxial blocks are not contraindicated but Guillain Barre Syndrome (GBS) patients are unduly sensitive secondary to the presence of sodium channel blocking factor and autonomic dysfunctions.^{7,8,9,11} Even with Neuraxial block many patients in the post operative periods need ventilatory therapy.

METHODOLOGY

Nobel Medical College Teaching Hospital, being a tertiary care hospital receives most of the problematic and serious patients from eastern part of Nepal. During the period from 1st August 2015 to 31st April 2020, pregnant ladies with Guillain Barre Syndrome (GBS) reported to operation theatre of Nobel Medical College Teaching Hospital for lower segment cesarean section (LSCS) under Rectus sheath nerve block with infiltration of retro pubic space of retzius has been done to evaluate the complications and whether there are any benefits of these technique compared with the published results of conventional spinal anaesthesia for such patients as reported in the literature. So according to World Medical Association (WMA)¹² recommendation of 2017, Lisbon about the "informed consent" a thorough "Disclosure" was made to all the patients in presence of their relatives about the diseases and operative procedure, probable benefit, risks, complications, advantages and disadvantages of general anaesthesia, neuraxial blocks and Rectus Sheath block supplemented with block of (a) 'Space of Retzius', (b) Infiltration analgesia and (c) Administration of low dose intravenous sedation, analgesic if needed.



All the patients and relatives opted for the third option and accordingly signed the "Informed consent" and "Approbation" as Pub med search did not reveal any report of this technique for Lower segment cesarean section (LSCS) in Guillain Barre Syndrome (GBS) patients.

Ethical approval from the hospital ethical Committee was first obtained before starting the research work. A retrospective descriptive analysis of all the pregnant ladies with Guillain Barre Syndrome (GBS) who underwent LSCS under abdominal field block was done. All medications were continued till the day of surgery, particular emphasis was given to fetomaternal outcome, complications, need for mechanical ventilators and effectiveness of the anaesthetics technique. Pregnant ladies with diagnosed Guillain Barre Syndrome (GBS) above the age of 16 years reported for LSCS were included in the study. All 15 pregnant ladies suspected to case of Guillain Barr Syndrome were thoroughly examined, investigated in the department of Neurology and finally stamped as GBS on the basis of clinical presentation, paraplegia, quadriparesis, absent tendon reflex, bilateral planter reflex, sensory symptoms and high protein in cerebrospinal fluid. The exclusion criteria were known documented evidence of allergy to local anaesthetics but no patients had such history of allergy to local anaesthetics, so all 15 patients were included in the study. According to Punit's classification for GBS, all patients were in grade IV of the disease. All the baseline investigations including Complete blood count(CBC) ,haemoglobin, blood sugar, blood urea, serum creatinine, platelets count and cerebrospinal fluid (CSF) examination done before the patient brought to the operation theatre. Once the patient arrived to the operation theatre the baseline monitors for heart rate (HR), Non invasive blood pressure (NIBP), Pulse oximeter (SPO2) attached and monitored. As mentioned earlier all patients opted for abdominal field block and accordingly signed the informed consent. In operation theatre after explaining the whole procedure again an intravenous infusion was started with Ringer lactate at the rate of 70ml/hour. Proper aseptic and antiseptic preparation of the abdomen was done. Another intravenous infusion of one gram paracetamol started and the following blocks were performed:

a) "Rectus sheath block": The fingers of one hand was gently placed over the rectus abdominis muscle and the patient was requested to raise the head and hold it for few seconds without any support so that rectus abdominis muscle becomes tough and its anatomy is felt with the palpating fingers. Skin wheals are raised (1) one on each side at the lateral margin of rectus just below the umbilicus. 2) One on each side below the semicircular line of "Douglas". (3) Third wheal about two centimeters above the symphysis pubis. Through wheals one and two a 21G, two inch blunt needle was slowly advanced perpendicular until it meets the resistance of the anterior layer of rectus sheath. At this point the patient will experience little pain when the anterior layer of rectus sheath is pierced with the feeling as if a tough stretched bed sheet is pierced. The needle is advanced further for 0.5 cm and 5ml of 1% lignocaine with adrenaline is injected between the

posterior layer of rectus sheath and rectus abdominis muscle so that the traversing intercostals nerves, supplying the muscles together with the area of skins medial to its outer border are blocked and anaesthetized. Below the line of Douglas, the solution is deposited between fascia transversalis and rectus abdominis muscles.

- b) Intradermal and subcutaneous infiltration was carried out in the line of incision and half inch lateral to it with 15 ml of 0.5% lignocaine with adrenaline.
- c) Two ml of 0.5% lignocaine with adrenaline was injected into the mass of each pyramidalis on both sides.
- d) Space of Retzius' block – Through the third wheal about 2 cm over the symphysis pubis a 25 G, three inch quinke spinal needle is inserted backwards and downwards but keeping its point as near the bone as possible and 20 ml of 0.5% lignocaine with adrenaline is then injected in the space of retzius.
- e) During the surgery the surgeon is requested to infiltrate the parietal peritoneum (if needed) and the tissue along with visceral peritoneum and extra-peritoneal fat over the lower segment with 5 ml of 0.25% lignocaine with adrenaline.
- f) Injection Propofol 1mg/kg at the rate of 4 ml/10second was administered just before the incision over the lower segment of the uterus. Once the baby is out injection fentanyl one microgram per kg intravenous was administered. For very apprehensive patients injection Midazolam 0.025mg/kg was also used. Five liters of oxygen by facemask was administered throughout the procedure. Surgeon was requested to avoid packing of the gut or to pack very gently and also not to exteriorize the uterus out of the abdominal cavity. All vital parameters like heart rate, oxygen saturation, non invasive blood pressure, temperature and electrocardiogram were continuously monitored throughout the operations as well as in Post Anesthesia Care Unit (PACU) and ICU/CCU. Apgar scoring and Neuro-humoral evaluations were done. After the surgery was completed all the patients were shifted to PACU for about four hours and then transferred to ICU/CCU for further management.

After the surgery was completed, Surgeon's opinion on operating field was sorted on the basis of Muscular relaxation, Straining, Coughing, Bucking, Undesired movements and were evaluated. Patients were also requested to grade as Excellent -when she was unaware of whole procedure, Very good- Aware but didn't felt any pain, Good- Aware but could adjust and tolerate the procedure, Satisfactory- aware and felt some sickening pain during the middle of the procedure which passed off with time, Worse-Aware and could not tolerate the whole procedure.

The collected data was entered in Microsoft Excel 13 and then statistical analysis of descriptive data was done using the SPSS version 12. The qualitative variables like patient's satisfaction and surgeon's opinion about the anaesthesia provided were done. The collected data was analyzed using descriptive statistics like frequency, percentage mean, median and standard deviation.



RESULTS

During the period from 1st August 2015 to 31st April 2020, the numbers of deliveries were 32,322 patients. Out of which 42 cases were diagnosed with guillain barre syndrome. Among these 14 patients had normal vaginal delivery, 13 patients had Instrumental vaginal deliveries. A total of 15 numbers of pregnant ladies between the age of 16 years to 38 years with the median age of 22.6 years with Guillain Barre Syndrome (GBS) reported for Lower segment cesarean section (LSCS) as can be seen in Table 1, two had lower segment cesarean section (LSCS) on emergency basis, rest were operated on routine lists. Majority 13 of the patients were primi-gravidarum. Mean duration of symptoms was 6.24 days. All the 15 patients presented in the third trimester at operation theatre. As can be seen in table 2 all the patients had classical symptoms of Guillain Barre Syndrome (GBS) including high level of protein in cerebrospinal fluid (CSF). None had respiratory involvement. Table 3 shows that intra-operative period of all the patients were uneventful except two patients had hypotension during exploration of uterine cavity which responded well with intravenous fluid bolus, calcium gluconate and hydrocortisone and two patients had sinus tachycardia which settled with oxygen and sedation. All patients recovered well neurologically and were discharged from the hospital subsequently. Apgar score and Neuro-humoral evaluation of the fetus did not need any active resuscitation.

Graph 1 showed that according to the patient's anaesthesia were very good in two patients, good in four patients and satisfactory in rest of the nine patients. There was no failure of blocks.

The surgeon's opinion was Satisfactory to Good on the basis of muscular relaxation, straining, coughing, bucking and undesired movements.

Table 1: Patient Profile

Characteristics	N=15(%)
Primi	13(86.66%)
Multipara	2 (13.33%)
Duration of symptoms (in days)	6.24
Elective LSCS	13(86.66%)
Emergency LSCS	2 (13.33%)
Post operative Mechanical ventilation	1(5th post operative day)
Time of Presentation: 3rd trimester	15(100%)

Table 1: Patient Profile

Characteristics	N=15(%)
Paraplegia	6(40%)
Quadripareisis	9(60%)
Absent of tendon reflex	12(80%)
Planter-Bilateral flexion	14/15
Sensory symptoms	12(80%)
Cerebrospinal fluid (CSF)	High proteins

Table 3: Intra-operative Vital Parameters

Parameters	N=15(%)
Hypotension(Systolic) fall below 20% of preoperative or less than 90mmHg	2(13.33%)
Fall in SPO2	None (0%)
Arrhythmias (Sinus tachycardia)	2(13.33%)
Hypothermia	None (0%)
Diaphoresis	1(6.66%)
Respiratory Insufficiency	None (0%)

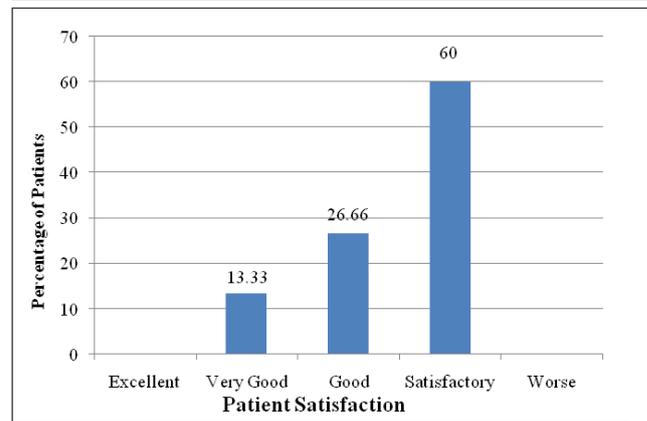


Figure 1: Patient's Satisfaction

Table 4: Patient's Treatment

Characteristics	
Duration of Surgery(mean±SD)	25±5.48 minutes
Length of ICU stay (days)	7 days (Range 4-18 days)
Post operative Mechanical Ventilation (days)	6 days(only 1 patient)
Length of hospital stay (days)	10.6 days (Range 9-28 days)

DISCUSSION

Closed claim analysis from all over the world shows that maternal mortality following cesarean section delivery under general anesthesia is much higher than other techniques. Presence of Guillain Barre Syndrome (GBS) in mother makes it worse particularly morbidity. This necessitates the use of a safe anaesthetic technique. An ideal anaesthetic technique for cesarean delivery should provide – (a) Good pain relief (b) Good relaxation of the abdomen (c) Absence of psychotic trauma to mother (d) Absence of toxicity, to any agent, to mother and infant (e) Absolutely safe, especially from aspiration of stomach contents (f) Absence of respiratory depression of the fetus. It may be noted that established fetal mortality following elective sections is greater than following normal delivery.

Considering all these gold standard anaesthetic technique for Lower segment cesarean section (LSCS), today is subarachnoid block. Epidural block can also be used if the patient had already an epidural catheter for labour analgesia. General Anaesthesia (GA) is also used if the patient opts for it or subarachnoid block is contraindicated. An alternatives to general anaesthesia (GA) and neuraxial

block is Rectus sheath block, first proposed by Carl Ludwig Schleich in 1899.¹³ Subsequently local infiltration technique along with supplementations of intravenous 0.25 g of thiopentone sodium just before the incision over the lower segment was reported by A. C Beck in 1947.¹⁴ This difficult issue was discussed at the Royal society of Medicine in the same year and they recommended this technique in their Proceeding of the Royal Society of Medicine (*Section Anaesthesia*) in August 1947, 1957 and 1962.¹⁵ But this could not gain the popularity because of advent of newer drugs and techniques. Moreover it is time consuming, inadequate training, higher failure rate and finally relative neglect on the subject. But a well trained anaesthesiologist should be well versed with all different techniques of anaesthesia, so that he/she can tailor the anaesthetic needs of his/her patients. So this technique may be considered for pregnant ladies with Guillain Barre Syndrome (GBS) undergoing LSCS because of the peculiar pathophysiology of the disease which might worsen during and after surgery due to severe autonomic dysfunction and lower motor neuron lesion. During anaesthesia, great attention should be paid to maintain preload, temperature control, postural changes, blood loss, respiratory insufficiency and peak airway pressure in case artificial ventilation is needed. Besides these, very frequently these patients exhibit wide fluctuation of blood pressure (BP), sudden profuse diaphoresis, peripheral vasoconstriction, tachycardia and cardiac conduction abnormalities. Orthostatic hypotension sometimes may be so severe that even elevating the head on a pillow leads to syncope and sudden death.⁴ Incidence of all these are much more common with general anaesthesia (GA) and neuraxial block. Infiltrations analgesia along with rectus sheath block, infiltrations of both Pyramidalis and Space of Retzius, supplemented with combinations of low dose intravenous ultra short acting anaesthetics, potent analgesics and anxiolytic may be an alternative. But for this cooperations of the patient and the surgeon are essential. Post operatively they should be watched carefully in an ICU/CCU. Pub med search did not reveal use of this technique in patients for lower segment cesarean section (LSCS) with Guillain Barre Syndrome (GBS). But for this a thorough knowledge of anatomy of the cutaneous nerve supply and its distribution to the muscles of the anterior abdominal wall is essential to perform an effective block. The area between umbilicus and symphysis pubis is supplied by T10 to L1 spinal nerves. The tenth nerve through lateral and anterior cutaneous branches supply the area of the umbilicus. The eleventh, twelfth and first lumbar nerves supply the area between umbilicus and the symphysis pubis. The rectus sheath is not arranged in the

same way throughout its length and is basically a splitting of the aponeurosis of the internal oblique and is reinforced anteriorly by the aponeurosis of the external oblique and posteriorly by the flat tendon of the transversus abdominis. The seventh to eleventh nerves run between the internal oblique and transversus abdominis up to the lateral margin of rectus sheath, then pierces it and runs over the posterior layer of the sheath behind the rectus muscle, supplies it and then pierces the muscle and finally becomes cutaneous to supply the area. The twelfth and the first lumbar nerves also supply the parietal peritoneum. The space of Retzius contains both somatic, parasympathetic (pudendal nerve) as well as sympathetic (Hypogastric nerve).¹⁶ This technique of anaesthesia can be used in any settings where facilities for general anaesthesia, resuscitation equipments in a well settled operation theatre is available provided the anaesthesiologist is well versed and well trained in this technique.

CONCLUSION

"In many cases local anaesthesia means least strain to the patient."

- T Gordh (1907-2010)

Rectus Sheath block along with space of retzius block supplemented with low dose ultrashort acting anaesthetic and analgesic can be a good alternative to general anaesthetics (GA) and neuraxial block for lower segment cesarean section (LSCS) in patients with Guillain Barre Syndrome (GBS). This might open a new vista for Nepal where Guillain Barre Syndrome (GBS) in pregnant ladies is not uncommon. But we must remember-

"Bright is the ring of words when the right man rings them up"

- Robert louis Stevenson (1850-1894)

LIMITATIONS OF THE STUDY

Comparison with other modalities of Anaesthesia in GBS patients for LSCS would be more precise in knowing the effectiveness among general and Spinal anaesthesia.

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CONFLICT OF INTEREST

There is no conflict of interest to declare.

FINANCIAL DISCLOSURE

None

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