Original Article

Outcome of Guillain-Barré Syndrome (GBS) During Peripartum Period: A Hospital-Based Observational Study

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Abstract

Objective: 1. To study the clinical profile, progression and outcome of GBS during peripartum period in a tertiary care hospital. 2. To identify the determinants of outcome in GBS during peripartum period. **Background:** Guillain-Barré Syndrome (GBS) is an acute, autoimmune disorder of the peripheral nervous system triggered by a bacterial or viral infection or other antecedent events. Modern day critical care has dramatically improved the outcome of GBS. GBS during pregnancy is rare with an annual incidence of 2.8/100,000 population. Pregnancy itself is a life-threatening condition and full of complications. GBS during pregnancy makes its more complicated in terms of both maternal and fetal care during peripartum period. **Methods:** This was a prospective study conducted by the Department of Neurology, Gauhati Medical College including 36 patients of GBS presenting during peripartum period in between December 2019 and November 2021. Their clinical and electrophysiological features were analyzed. Hughes grading, EGRIS, mEGOS, MRC sum score were used. The fetal outcome was observed and patients were followed up for GBS outcome at 3 months and 6 months. **Results:** The mean age of patients was 25.97 years. AIDP was the most common subtype found in 21 (58.33%) patients followed by AMAN in 7 (19.4%), AMSAN in 3 (8.33%). In 3 cases NCS was equivocal and in 3 cases inexcitable. Respiratory distress was found in 13 (36.1%) cases, out of which 4 (11.1%) required mechanical ventilation and 1 (2.8%) died. The pre-term birth rate and stillbirth rate were 35.7% (n = 10) and 8.33% (n = 3), respectively with 66.7% (n = 24) spontaneous vaginal delivery(SVD). At 3 month 26 (72.2%) had complete recovery. 5 (13.9%) and 4 (11.1%) had partial and poor recovery, respectively. 78.9% of primigravidae had complete recovery in comparison to 64.7% in multigravidae indicating better outcome in primigravidae in this study. **Conclusion:** The outcome of GBS during peripartum period is favorable. Primigravidae are more commonly affected but have better outcome than the multigravidae. The risk of developing GBS in pregnancy decreases significantly after delivery and is minimal after 2 weeks. GBS is not an indication for LSCS. Stillbirth rate and preterm birth rate is higher in pregnancy associated with GBS without fearsome neonatal complications.

Keywords: Multigravidae, peripartum Guillain Barré syndrome, primigravidae

Introduction

Guillain-Barré Syndrome (GBS) is an acute, autoimmune disorder of the peripheral nervous system triggered by bacterial or viral infection or other antecedent events. Annual incidence varies from 0.4-4 cases/100,000 population.[1] GBS during pregnancy is rare with annual incidence of 2.8/100,000 population.[2] A good leap of advancement has occurred in etiopathogenetic and clinical diversity but the management part has remained the same. Due to widespread availability of good supportive care and existing treatment modalities the outcome has improved.[3] Modern day critical care has dramatically improved the outcome of GBS as the mortality rate has reduced from 33% to 1-5% after introduction of positive pressure ventilation.[3] Natural history studies show that about 10 to 20% of patients remain severely disabled and about 5% die. Determinants of disease progression and recovery in GBS are still poorly understood. The timing of GBS onset during pregnancy varies. In an earlier study 13% of cases occurred in the first trimester, 47% in the second, and 40% in the third trimester.[4] In an Indian study one (12.5%) of the women presented in 2nd trimester, 3 (37.5%) of them in 3rd trimester, while 50% of them presented in the postnatal period.[5] There was an increased incidence in the postpartum period with an odds ratio of 2.93 (95% Cl = 1.20-7.11).[6] 34.5% of women suffering from GBS during pregnancy required ventilatory support and the maternal mortality exceeded 10%.[7] In the study done by Chan *et al*.,[4] 23 women progressed beyond the second trimester and caesarean sections were performed in 14 (61%) cases. Uterine contraction is not affected despite of extensive peripheral nerve involvement in GBS and most of the patient normally deliver vaginally without any complications.[4] In a study done by Sharma *et al*.,[8] vaginal delivery was done in 42 cases, Caesarean section in 4 cases and instrumental delivery in 1 patient whereas premature rupture of membrane was seen in 3 patients and preterm delivery in 1 patient.[8] Among the neurological illnesses during pregnancy, GBS

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Submitted: 20-Apr-2022 **Revised:** 10-May-2022 **Accepted:** 11-May-2022
Published: 21-Jun-2022

DOI: 10.4103/aian.aian_362_22

is a well-known but rare entity that makes its management more complicated in terms of both maternal and fetal care especially during peripartum period. This study will be helpful in assessing and managing GBS during peripartum period along with risk assessment and prognostication in terms of complications, maternal and fetal outcome.

Methods

This was a prospective study including 36 patients of GBS presenting during peripartum period in between December 2019 and November 2021. Approval was taken from the institutional ethical committee and written informed consent was taken from all patients/guardian of the patient. No additional intervention was tried because of the study and the normal treatment protocol of GBS was followed. A complete neurological examination (cranial nerve examination, muscle power charting, reflexes, and sensory examination, GBS disability scale and MRC sum score at admission were taken. Nerve conduction study (Motor, Sensory, and F response) were recorded. Brighton Criteria for Diagnosis of Guillain-Barré Syndrome (GBS) was used. Nerve conduction studies helped to confirm and categorize the diagnosis and subtypes of GBS. Based on NCS, patients were categorized into AIDP (Acute inflammatory demyelinating polyradiculoneuropathy), AMAN (Acute motor-axonal neuropathy), AMSAN (Acute motor-sensory axonal neuropathy), In-excitable (absent CMAP in all motor nerves), Equivocal group.

A record of follow up at 4 weeks, 12 weeks, and 6 months was obtained for all patients which was a scale based assessment of disability (using Hughes GBS disability scale) based on follow up. The primary outcome measure was the disability at 3 months and 6 months analysis. The outcome in those who were able to perform their daily activity independently were taken as complete recovery whereas those who were able to do daily activity with help was taken as partial and bedridden or wheelchair bound were taken as poor recovery. The complete recovery cases were taken as good outcome and the rest were taken as bad outcome and analysed. Age, Age >30 years, Day of presentation, day of peak illness, Hughes grade at day 1, 4 week, and 12 week, mEGOS, EGRIS, MRC sum score day 1, Autonomic dysfunction, Respiratory distress, CSF cells, CSF protein, Albuminocytological dissociation, F wave abnormality, Non-stimulable nerves, IVIg, need for Mechanical ventilation were analyzed for the predictors of outcome.

Data were checked for normality using Kolmogorov-Smirnova and Shapiro-Wilk test. Independent T test is used to compare mean difference between two groups depending on fulfilment of normality assumption for continuous variables. Chi-square test is used to evaluate categorical variables. There is no missing data or no loss to follow-up.

Results

A total of 36 patients were included with a mean age of 25.97 years (median 25, range 19-36 years). The patients presented with a mean duration of 8.33 ± 4.45 days after onset of illness and peak of illness was reached at a mean duration of 12.17 ± 4.6 days. Majority of patients were primigravida (n = 19) followed by 11 in gravida 2, 5 in gravida 3 and 1 in gravida 4. The trend was similar in para with 21 in para 1, 12 in para 2 and 3 in para 3. Maximum number (n = 14) of patients were at 37 weeks of gestation when disease onset occurred. Out of which 19 were preterm and 17 at term stage of pregnancy. Out of 36 peripartum patients, 28 were antepartum and 8 were postpartum. 6 out of 8 postpartum cases developed weakness on same day of delivery. 20 (55.6%) cases had antecedent illness with fever in 9 (25%), diarrhoea and sore throat in 5 (13.9%) each. AIDP was the most common subtype found in 21 (58.33%) patients followed by AMAN in 7 (19.4%), AMSAN in 3 (8.33%). In 3 cases, NCS was equivocal and 3 cases were inexcitable. Fever and diarrhoea were the most common antecedent illness in AIDP and AMAN respectively. The detailed clinical profile is mentioned in Table 1. The mean EGRIS and mEGOS were 3.67 and 4.64, respectively. The mean CSF protein level was 110.14 ± 88.21 mg/dl. 22 (61.1%) had albuminocytological dissociation and 15 patients had CSF protein more than 100 mg/dl. 34 (94.4%) patients received IVIg.

Pregnancy outcome

Out of 36 patients spontaneous vaginal delivery was the most common mode of delivery in 24 (66.67%) followed by caesarean section in 10 (27.78%) patients. In two cases,

Table 1: Clinical profile of peripartum GBS cases

Variables	Case
Age in years (mean±sd)	25.97±4.97
Maximum patient age group	21-25 years: 15 (41.7%)
Day of hospitalization after onset	8.33±4.45
Day of peak illness	12.17±4.6
Antecedent events	20 (55.6%)
Diarrhoea	5 (13.9%)
Fever	9 (25%)
Sore throat	5 (13.9%)
Sensory involvement	16 (44.4%)
Cranial nerve involvement	20 (58.3%)
Facial	20 (58.3%)
Bulbar	14 (38.89%)
Ophthalmoplegia	1 (2.8%)
Autonomic dysfunction	8 (22.2%)
Respiratory involvement	13 (36.1%)
DTR (deep tendon reflexes)	
Generalized areflexia	21 (58.3%)
Partial	11 (30.6%)
Retain	3 (8.3%)
Brisk	1 (2.8%)
Mechanical ventilation	4 (11.1%)
Complications	
Bedsore	4 (11.1%)
Lower respiratory tract infection	1 (2.8%)
Urinary tract infection	2 (5.6%)
Sepsis	1 (2.8%)

Table 2: Outcome of peripartum GBS cases

Variables	Case
mEGOS	4.64±1.95
EGRIS	3.67±1.43
MRC sum score day 1	30.44±14.05
Hughes grade day 1	3.89±0.57
Hughes grade 4 week	3.31±0.85
Hughes grade 12 week	2.03±1.34
3-month recovery	
Complete	26 (72.2%)
Partial	5 (13.9%)
Poor	4 (11.1%)
Death	1 (2.8%)
6-month recovery	
Complete	26 (72.2%)
Partial	6 (16.7%)
Poor	3 (8.3%)
Death	1 (2.8%)

Table 3: Predictors of outcome in peripartum GBS

	Case		
	Good Outcome (*n*=26)	Bad Outcome (*n*=10)	*P*
Age	26.19±4.34	25.40±6.55	0.675
Day of presentation	7.85±4.13	9.6±5.25	0.297
day of peak illness	11.08±3.46	15±6.07	0.02
Hughes day 1	3.73±0.53	4.3±0.48	0.006
Hughes 4 week	2.96±0.66	4.2±0.63	<0.001
Hughes 12 week	1.31±0.62	3.8±0.92	<0.001
mEGOS	4.12±2.03	6±0.82	0.008
EGRIS	3.31±1.46	4.6±0.84	0.013
MRC D1	35.77±11.67	16.6±9.76	<0.001
CSF cells	3±0.75	3.2±1.14	0.54
CSF protein	98.23±69.01	141.1±124.73	0.196
Age >30 years	3	3	0.183
Autonomic dysfunction	4	4	0.112
Respiratory distress	6	7	0.009
Albuminocytological dissociation	16	6	0.932
F wave abnormality	14	3	0.63
Non-stimulable nerves	7	8	0.004
IVIg	23	10	0.2619
Mechanical ventilation	1	3	0.025

instrumental vaginal delivery was done by using forceps in one and ventouse in other due to fetal bradycardia during second stage of labour suspecting fetal hypoxia. Otherwise, all the deliveries were uneventful without any obstetric complications. Out of 36 deliveries in 3 (8.33%) fetal outcome was stillbirth. Two babies were delivered by LSCS from primigravida mother because of fetal distress and eclampsia. 11 (30.6%) deliveries were preterm, out of which 2 were LSCS and 9 were SVD. Out of 11 preterm birth one was postpartum GBS and 10 were antepartum GBS. Preterm birth rate will be much higher that is 10 (35.7%) out of 28 if we consider antepartum GBS. Out of 33 reported live birth one baby required neonatal ICU care and recovered completely. No neonatal GBS was reported.

Neurological outcome

1 (2.8%) patient died of sepsis. At 3 months, 26 (72.2%) had complete recovery whereas 5 (13.9%) and 4 (11.1%) had partial and poor recovery, respectively. At 6 months, 1 out of the poor recovery patient improved to partial recovery stage and the complete recovery patients remained the same that is 72.2%. The detailed neurological outcome mentioned in Table 2. At 3 months, 78.9% of primigravida had complete recovery but 64.7% of multigravida achieved the same.

Predictors of outcome

While the age, day of presentation after onset, the day of peak illness were statistically insignificant for outcome, the high Hughes grading at day 1, 4 weeks, 12 weeks, EGRIS, eMIGOS, low MRC sum score day 1, presence of respiratory distress, non-stimulable nerves in NCS, and requirement of mechanical ventilation were statistically significant for bad outcome measure at 3 months recovery. The detailed predictors of outcome mentioned in Table 3.

Discussion

The patients were relatively younger with mean age of 25.97 ± 4.97 (median 25 years). Shrivastava M *et al*.[9] found the mean age 40.69 ± 18.8 years. This may be because pregnancy usually occurs more during the early reproductive age in India. Majority of patients were primigravidae (n = 19). Maximum number (n = 10) of patients presented at 37 weeks of gestation and most of the patients presented antepartum (n = 28). Sharma *et al*.[8] found 13 (27%) out of 47 cases in primigravida.[8] In a study done by Rupalakshmi *et al*.,[5] out of 8 cases 3 (37.5%) were primigravida.[5] Only 8 (22.2%) of patients were postpartum out of which 6 had disease onset on the same day of delivery, one each on the 3rd and 14th day of postpartum. This indicates that the risk of developing GBS in pregnancy decreases significantly after delivery and minimal after 2 weeks. The mean duration of presentation from onset of disease in days was 6.69 ± 2.93 similar to 5.7 days in the study by Sharma *et al*.[8] but earlier than the study by Kalita *et al*. (10.6 days).[8,10] This delay in presentation might be due to initial nonspecific symptoms that mimic physiological changes in pregnancy.[4]

20 (55.5%) had facial nerve palsy which is more in comparison to the study by Sharma *et al*.[8] in pregnant GBS where it was found in 10% cases only. Zhang *et al*.[11] found sensory involvement in 52.7% of cases. Cranial nerve involvement was similar to Kalita *et al*.[10] study and Zhang *et al*.[11] study (50.5%), whereas in two other studies done in pregnant GBS by Sharma *et al*.[8] and Shrivastava *et al*.[9] a very high number of cases that is 35 (75.2%) and 39 (87.9%) respectively were not having any cranial nerve involvement. In a study by Chan *et al*.,[4] 10 (33.3%) out of 30 GBS during pregnancy

Table 4: Comparison of different studies

Parameters	In this study	Sharma *et al*.[8] (*n*=47)	Kalita *et al*.[10] (*n*=328)	Shrivastava *et al*.[9] (*n*=47)
Facial weakness	20 (55.5%)	5 (10%)	145 (44.2%)	
Bulbar weakness	14 (38.8%)	7 (14.8%)	99 (30.2%)	8 (12.1%)
Sensory symptoms	16 (44.4%)	32 (68%)	173 (52.7%)	2 (3%)
Autonomic dysfunction	8 (22.2%)	9 (19.1%)	67 (20.7%)	
Respiratory involvement	13 (36.1%)		100 (30.5%)	14 (21.2%)
Ventilatory support	4 (11.4%)	2 (4.2%)	43 (13.1%)	
Subtype/variant				
AIDP	21 (58.3%)	33 (50%)	272 (73.8%)	32 (72.7%)
AMAN	7 (19.4%)	29 (43.9)	44 (13.4%)	12 (27.7%)
AMSAN	3 (8.3%)	2 (3%)	15 (4.6%)	
INESCITABLE	3 (8.3%)		8 (2.4%)	
EQUIVOCAL	2 (5.6%)	2 (3%)	19 (5.8%)	

required mechanical ventilation whereas only 4.2% required in our study.

AIDP (58.3%) cases were less in comparison to 60.36% in Zhang *et al*. study, 73.8% in Kalita *et al*.[10] study and 72.7% in Shrivastava *et al*.[9] study whereas more than that of Sharma *et al*.[8] study (50%). In two other study by Sharma *et al*.,[8] (43.9%) and Shrivastava *et al*.[9] (27.7%) in pregnant GBS more percentage of patients were AMAN. AMSAN subtype was more in this study i.e., 11.1% in comparison to 3% by Sharma *et al*. and 4.6% by Kalita *et al*.[8,10] More percentage of AMAN and AMSAN were found and less percentage of AIDP in comparison to pre-existing studies. Only 2% patients in the study by Sharma *et al*.,[8] 33.7% in Kalita *et al*.,[10] 36.04% in the study by Zhang *et al*.[11] and 37.5% in the study by Rupalakshmi *et al*.[5] received IVIg whereas 91.7% in this study received IVIg. The very high percentage of patient in our study received IVIg because it was easily available and free of cost. It was given to all the patients who fulfil the indication of IVIg therapy. In this study only 1 (2.8%) patient died. In Rajabally *et al*.[12] analysis, 61 (4.4%) out of 1391 patient died. mortality was similar to many of the studies except 25% of pregnant GBS in a study of 8 patient by Rupalakshmi *et al*.[5]

At 6 month 88.9% of cases were able to walk unaided in this study similar to 100 (82%) out of 122 in analysis done by Rajabally *et al*.[12] 72.2% of our patient had complete recovery at 3 months in comparison to 46.6% of the study by Kalita *et al*.[10] 78.9% of primigravidae had complete recovery in comparison to 64.7% in multigravidae indicating better outcome in primigravidae in this study. Need for mechanical ventilation, Preceding diarrhoea, Low MRC Sum Score at admission, Short interval between weakness onset and admission, Facial and/or bulbar weakness, electrophysiologically Inexcitable nerves were indicators of poor outcome in pooled analysis done by Rajabally *et al*.[12] Kalita *et al*.[10] found similar outcome predictors like cranial nerve involvement, bulbar weakness, higher disability grade, dysautonomia, generalized hyporeflexia, inexcitable nerves, mechanical ventilation as statistically significant whereas day of admission, use of IVIg were nonsignificant. Similar to this study, the duration of admission after onset and use of IVIg was not significant but low MRC sum score, requirement of mechanical ventilation statistically significant as prognostic indicator by Zhang *et al*.[11] Wen *et al*.[13] also found IVIg treatment non-significant as an indicator of good outcome. The comparison of different studies mentioned in Table 4.

24 (66.67%) out of 36 patients had spontaneous vaginal delivery followed by caesarean section in 10 (27.78%) patients similar to that of Rupalakshmi *et al*.[5] where 25% had LSCS and 75% had vaginal delivery. Sharma *et al*.[8] who studied 47 pregnant GBS found 89.3% cases to have spontaneous vaginal delivery and 2.1% requiring ventouse. Chan *et al*.[4] in his 23 GBS patients found that 61% required LSCS, 34.7% having SVD and only one requiring instrumental delivery by forceps. In study done by Sharma N *et al*.,[14] out of 4636 deliveries, 31.1% underwent LSCS and 68.9% had vaginal delivery. Maskey S *et al*.[15] found that out of 862 deliveries 36,8% were LSCS whereas 63.1% and 0.51% were vaginal deliveries and instrumental deliveries, respectively. The rate of LSCS in our institution where study was done is 50.6% which is higher than the LSCS rate in peripartum GBS in our study indicating that GBS is not an indication for LSCS.

Out of 36 deliveries, in 3 (8.33%) fetal outcome were stillbirth in this study. In the study done by Chan *et al*.,[4] preterm deliveries occurred in eight (34.7%) cases, of which three had spontaneous labour while five were iatrogenic preterm deliveries due to deterioration of maternal neurological condition (three cases) or pre-eclampsia (two cases). In our study, 11 (30.6%) out of 36 deliveries were preterm out of which 2 were LSCS and 9 were SVD. Out of 11 preterm birth one was postpartum GBS and 10 were antepartum. 10 out of 11 of our preterm birth mothers had GBS antepartum. Out of 36 peripartum patient, 28 were antepartum and 8 were postpartum. If we consider the antepartum GBS, the preterm birth rate will be much higher that is 10 (35.7%) out of 28. In the study by Chan *et al*.,[4] only in 1 (4.3%) out of 23 deliveries there was fetal death due to maternal death and rest 22 cases were

normal. The fetal death in our study was more. In the study done by Rupalakshmi *et al*.,[5] 3 (37.5%) out of 8 deliveries were pre-term and 2 (25%) was stillbirth. The percentage of preterm delivery and stillbirth in our study is similar to that of Chan *et al*.[4] and Sharma *et al*. but less than the study by Rupalakhmi *et al*. where sample size (n = 8) was small. The stillbirth rate and preterm birth rate in our institution where study was conducted is 4.79% and 20.6% respectively. The preterm birth rate (35.7%) in our study is much higher than global data (11%).[16] GBS during pregnancy can be a risk factor for preterm birth and stillbirth and can affect the fetal outcome adversely. In the study by Chan *et al*.,[4] out of 22 reported live births, only one baby was having neonatal GBS and 20 babies were normal without any complications. In our study, out of 33 reported live birth one baby required neonatal ICU care and recovered completely. No neonatal GBS was reported. In the study by Sharma *et al*.,[8] five babies required NICU care. Though preterm birth and stillbirth rate are higher, most of the babies born out of GBS mother were normal without any complication.

The physiological changes and decrease ambulation during later part of pregnancy may mask the initial sign and symptoms of GBS hence physician must be vigilant for early diagnosis and definitive management for a better fetal and maternal outcome. GBS is not an indication for LSCS. Stillbirth rate and preterm birth rate is higher in pregnancy associated with GBS without fearsome neonatal complications. The reason may be because most of the preterm birth were at late preterm that is not less than 34 weeks (not modest to extreme) which is a scope for further study in larger group of GBS patients during pregnancy.

Conclusion

The outcome of GBS during peripartum period is favorable. Primigravidae are more commonly affected but have better outcome than the multigravidae. The risk of developing GBS in pregnancy decreases significantly after delivery and is minimal after 2 weeks. GBS is not an indication for LSCS. Stillbirth rate and preterm birth rate is higher in pregnancy associated with GBS without fearsome neonatal complications.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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