

Perioperative Outcome of Jaundiced Parturients undergoing Caesarian Section - A Retrospective Analysis

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ABSTRACT

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Background: This study aims to retrospectively evaluate the causes, anaesthetic management and perioperative outcome of pregnant women with jaundice undergoing Caesarian section in a tertiary care hospital in India.

Patients and Methods: The medical records of all pregnant women with jaundice who underwent caesarian section in our hospital between March 2005 and February 2015 were analysed.

Results: Analysis revealed a 7-fold rise in the incidence of parturients with jaundice undergoing Caesarian section in February 2015, when compared to the incidence in March 2005. 38.3% of the patients had acute fatty liver of pregnancy (AFLP), while HELLP Syndrome occurred in 23.8%. 14.2% of the patients had jaundice due to cholestasis of pregnancy. Jaundice was due to infective and congenital causes in 14.2% and 9.5% cases, respectively. 81% of the cases came as emergencies while the remaining 19% were booked cases. 61.9% received general anaesthesia, while the surgery was done under spinal in 38.1% of patients. Perioperative complications were coagulopathy (42.9%), hypoglycemia (23.8%), uterine atonicity (14.3%), dyselectrolytemias (9.5%), respiratory problems (9.5%), encephalopathy (9.5%) and renal failure (4.8%).

Conclusion: Early anticipation and intensive supportive management are critical for improving the perioperative outcomes in pregnant jaundiced women undergoing caesarian section.

Keywords: Caesarian section, Developing countries, Jaundice, Perioperative period, Postoperative complications, Retrospective studies

*See End Note for complete author details

INTRODUCTION

Liver disease occurs in upto 3% of pregnant women¹ 10-15% of them end up as caesarian sections.² This means that at least 0.30-0.45% of the patients coming for caesarian section will have jaundice. Although rare, this segment contributes to about 10% of the total maternal deaths.³ The management of these jaundiced parturients is an extremely tremendous challenge and should be the joint effort of the obstetrician, anaesthetist, intensivists as well as the hepatologist.

Only a few studies have examined the exact incidence and perioperative outcome of this entity among the pregnant women in developing countries. Hence, we undertook a retrospective study on pregnant women with jaundice who underwent caesarian section over a period of ten years.

Setting: This study was carried at Jubilee Mission Medical

College and Research Institute, located in Thrissur district of Kerala State in South India.

Data Collection: The medical records of all pregnant women with clinical jaundice who underwent caesarian section/hysterectomy between March 1, 2005 and February 28, 2015 were retrieved. Data on the medical history, medication, surgical procedure, anaesthetic management and subsequent stay in the hospital were analysed. Details of peripartum complications, if any, were noted.

Data selection: A total of 10297 pregnant patients underwent Caesarian sections/hysterectomy during the study period, among whom only 24 (0.23%) had jaundice. Two patients were excluded from the study due to the lack of adequate medical records. Another patient was removed from the study as it was a case of failed subarachnoid block which necessitated general anaesthesia.

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RESULTS

Incidence: Data analysis revealed a seven-fold increase (28.5%) in the incidence of parturients with jaundice presenting for caesarian section in the study period (4.8% in the first two years of study, compared to 33.3% in the last two years) (figure 1).

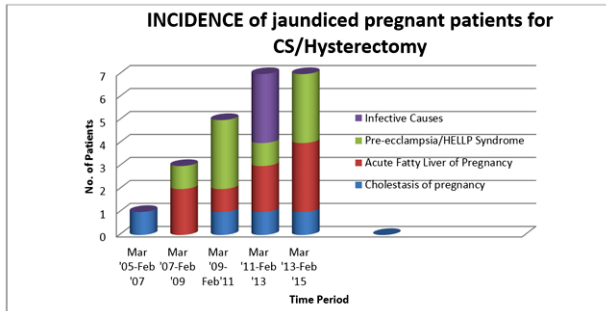


Figure 1. Incidence of jaundiced pregnant patients presenting for caesarian section/hysterectomy

Causes: Acute fatty liver of pregnancy was the leading cause (38.1%), followed by pre-eclampsia/HELLP Syndrome (28.6%), cholestasis of pregnancy (19.04%) and infective causes (14.3%) (Table 1).

Table 1. Table showing the etiology and perioperative details of the cases studied				
Causes of Jaundice	Number of patients	Type of Anaesthesia		Post-operative Outcome
		General	Regional	
Acute fatty liver of pregnancy	8	6	2	Five patients required ventilation. One expired on 5th POD due to hepatic encephalopathy.
Preeclampsia/HELLP syndrome	6	4	2	Two patients required ventilation All survived.
Cholestasis of pregnancy	4	2	2	One patient needed ventilation. All survived.
Infectious causes	3	0	3	None were ventilated. All survived.
Total	21	12	9	-

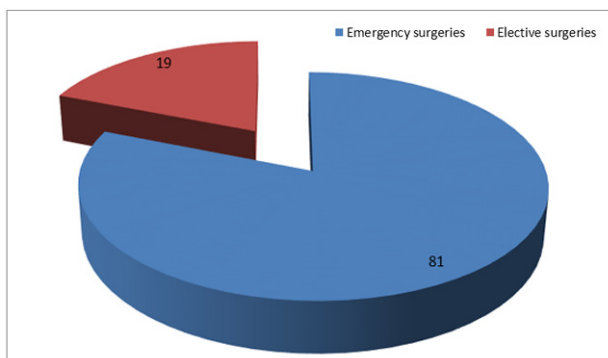


Figure 2. Diagram showing the presentation to the anesthetist - emergency or elective

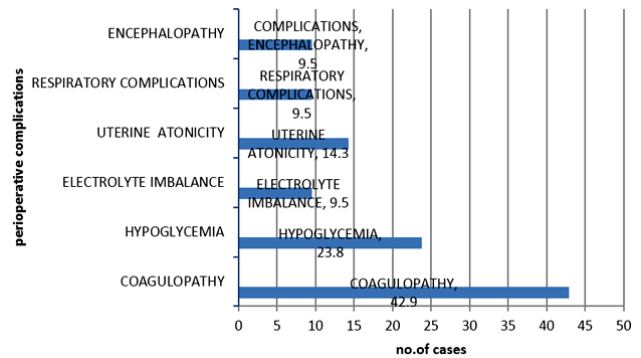


Figure 3. Bar diagram showing the incidence of postoperative complications among the subjects

Presentation: A total of 17 cases (81%) were referred from peripheral centres and underwent emergency surgeries (81%). Only 4 (19%) cases were done as elective surgeries after optimization (figure 2).

Type of anaesthesia: Among the patients, 13 (61.9%) received general anaesthesia while 8 (38.1%) patients had regional anaesthesia (Table 1).

Complications: Coagulopathy occurred in 42.9% of the cases, while renal failure developed in 4.8%. The other perioperative complications included hypoglycemia (23.8%), uterine atonicity (14.3%), electrolyte imbalance (9.5%), respiratory complications (9.5%) and encephalopathy (9.5%) (figure 3).

Maternal mortality: Only one maternal death occurred among the subjects. Her jaundice resulted from acute fatty liver of pregnancy. The patient presented as an emergency, was operated under general anaesthesia and required ventilation postoperatively. She developed coagulopathy, uterine atonicity and encephalopathy. She could not be weaned from the ventilator and expired on the fifth postoperative day.

Perinatal mortality: No perinatal death occurred among the subjects.

DISCUSSION

The congenital and acquired liver disorders presenting during pregnancy may be broadly categorized into three groups:

- i. Specifically related to pregnancy - These resolve either spontaneously or following delivery, e.g., hyperemesis gravidarum, intrahepatic cholestasis, acute fatty liver of pregnancy (AFLP) and hepatocellular damage with preeclampsia (HELLP Syndrome).

- ii. Coincidental to pregnancy - e.g., acute viral hepatitis.
- iii. Chronic liver disease that predate pregnancy – e.g., chronic hepatitis, cirrhosis

We provide a discussion of category (i) below.

Hyperemesis gravidarum: It is defined as intractable nausea and vomiting during pregnancy. It usually occurs in the first trimester and resolves by the 20th week. However, the complaints may persist in about 10% of the patients and resolve only after delivery.

They often manifest fluid and electrolyte abnormalities, weight loss and nutritional deficiencies. About 50-60% will have hepatic involvement, manifested as a mild increase in the serum aminotransferases.⁴

Intrahepatic cholestasis: It is due to an abnormality in the biliary transport across the canalicular membrane. It is characterized by pruritus (80%) and jaundice (20%), and develops due to elevated levels of serum bile acids. It usually occurs in the second trimester and resolves after delivery.

The laboratory findings include elevated bilirubin levels and minimally increased transaminases. Though the maternal mortality is low, there is a high risk of fetal complications due to chronic placental insufficiency. Chances of recurrence in subsequent pregnancies are as high as 60-70%.^{5,6}

Acute fatty liver of pregnancy: This life-threatening condition, associated with a high incidence of maternal and fetal complications, occurs due to a genetic mutation of the mitochondrial fatty acid oxidation. Primigravidae, preeclamptic patients and women with multiple pregnancies have a higher risk for this condition.

The clinical symptoms include nausea, vomiting, abdominal pain, fever, headache and rapidly deepening jaundice. It is usually seen in the last trimester. Findings include leucocytosis, neutrophilia, thrombocytopenia, moderately elevated liver enzymes, significantly raised serum bilirubin levels and abnormal coagulation profile (prolonged PT and aPTT and decreased fibrinogen).

The potential complications include coagulopathy, gastrointestinal bleeding, renal failure, pancreatitis, hypoglycemia and preeclampsia.^{5,7,8}

Pre-eclampsia/HELLP syndrome: It manifests as peripartum multi-organ damage with preeclampsia, hemolysis, elevated liver enzymes and low platelet count. The symptoms include nausea, vomiting, headache and abdominal pain in the right upper abdominal quadrant.

About 25% of the patients with severe preeclampsia and 90% of those with eclampsia will have elevated aminotransferase (upto 5-fold) and minimally elevated serum bilirubin, along with a low platelet count. Maternal LDH levels and platelet counts are useful markers of the disease progression.^{7,9,10}

Effects of disease progression: The spectrum of liver disease in pregnancy may range from mild asymptomatic transaminitis to fatal and irreversible deterioration in the liver function leading to significant morbidity and even mortality.¹¹ The manifestations may be direct as well as systemic (**table 2**)

The direct effects include hypoglycemia, lactic acidosis and azotemia. The deficiency of fat-soluble vitamins can occur due to defective cholesterol metabolism. The synthesis of proteins like albumin, clotting factors and thyroid binding globulins is often reduced. Low protein binding, impaired hormone biotransformation and reduced synthesis of the modulator proteins can result in increased circulating levels of insulin, thyroxine, aldosterone and estrogen.

The involvement of the cardiovascular system can cause tachycardia, bounding pulse, systolic murmurs and shunts. Vascular shunts and vasodilatation can result from low systemic vascular resistance, high cardiac output and high mixed venous saturation. Pulmonary findings such as dyspnoea, cyanosis and clubbing may be found due to the impaired hypoxic vasoconstriction and ventilation-perfusion (V/Q) mismatch. Functional residual capacity is reduced due to pleural effusion and ascites. Anaemia, thrombocytopenia, platelet dysfunction and low circulating levels of clotting factors may result in coagulopathy. Neuropsychiatric manifestations include altered sleep rhythm, confusion, lethargy, somnolence and even coma. These occur due to the penetration of the blood-brain barrier by the accumulating neurotoxic compounds. The presence of GI bleed, sepsis or even a dietary overload of proteins may worsen them. Renal impairment may manifest as acute tubular necrosis or hepatorenal syndrome. Pre-renal failure may occur in upto 10% of patients with chronic liver failure. Electrolyte abnormalities like hyponatremia can also occur.^{4,10,12}

Anaesthetic implications

Labour analgesia: Epidural anesthesia may be beneficial especially in pre-eclamptic patients to reduce the stress response. However, it must be given cautiously in patients with coagulopathy due to the risk of epidural haematoma.

Table 2. Factors associated with grave prognosis in jaundiced patients¹⁴

Factors associated with grave prognosis

Age > 40 years
Serum bilirubin >17.5 mg/ml
Prothrombin Time > 50 seconds
Leucocytosis refractory to broad spectrum antibiotics
Ascites
Poor nutritional status
Sepsis
Treatment with more than two antibiotics
Emergency surgery
Renal failure
Encephalopathy stage 3 or 4
Duration of jaundice prior to encephalopathy > 7days

Caesarean section: The choice of anaesthesia largely depends on factors like coagulopathy, severity of hepatic dysfunction and hemodynamic stability.^{7,10,12,13}

Optimisation and pre-medication: The patients should be taken up only after a thorough pre-operative assessment. Residual hepatic function, assessed by the prothrombin ratio (PT/INR) is more reliable than the serum albumin levels. Fresh frozen plasma (FFP), fresh blood and parenteral vitamin K may be given to correct coagulopathy. Adequate FFP (minimum 4-6 units) must be kept ready especially if the PT/INR is more than 2 and fibrinogen levels are below 100 mg. The protein levels should be optimized by giving albumin infusions. Hyponatremia should be corrected slowly with 3% saline, bearing in mind the possibility of central pontine myelinolysis. These patients should be adequately hydrated with normal saline, so as to maintain a urine output of at least 1.0 ml/kg/hr. Hydration should be initiated at least 12 hours pre-operatively and continued for 36 hours after the surgery.

H2 receptor antagonists may be given to reduce the gastric secretions.

Monitoring: Monitoring of ECG, oxygen saturation, non-invasive blood pressure, urine output and capnometry are mandatory. Invasive monitoring may be of help in patients with hypotension or cardiac failure. The jugular route is opted for central venous access. Arterial monitoring may guide the inotropic therapy. The coagulation status and sugar levels must be routinely monitored.

General anesthesia: This is the commonly opted mode as most patients have coagulopathy. Hypoxemia and hypotension must be avoided at all costs. Fluid management must be meticulously done, so as to maintain the urine output above 0.5 ml/kg/hr.

Each drug must be carefully titrated to achieve the required effect. Rapid sequence induction is indicated as these patients are considered to be 'full stomach'. All widely used induction agents have been used. Succinyl choline may be used to facilitate endotracheal intubation. Atracurium is the relaxant of choice due to its unique metabolism. However, it must be borne in mind that the initial dose requirements are higher. Isoflurane is the preferred inhalational agent, as it increases the hepatic blood flow. Short-acting opioids like fentanyl or remifentanyl may be used for analgesia.

Oxygen-enriched air must be administered in the immediate post-operative period. Blood loss must be replaced with the appropriate blood components.

Regional anesthesia: It may be given in patients without coagulopathy or hemodynamic instability. Lower volumes of local anaesthetic are required in cases with ascites. Elevated Prothrombin Time (>2.5 times above the control), thrombocytopenia (<50,000/mm³) and prolonged bleeding time (>12 min) are absolute contraindications to its use.

A regional block avoids the undesirable effects of general anaesthesia on the liver, such as a reduced blood flow caused by the controlled ventilation, stress response associated with airway management and hepatotoxicity caused by the anaesthetic agents. Normotension is essential for maintaining the hepatic blood flow. Special attention should be given to the postpartum period when auto transfusion occurring after delivery of baby coincides with the regression of the block.

CONCLUSION

The present study shows that the incidence of jaundice in pregnant patients presenting for caesarian section in our hospital is comparable with the global incidence. The perioperative outcome was superior in elective cases, where there was ample time for optimization. We also observed that patients with jaundice of infectious etiology had a better prognosis.

We noted a dramatic decrease in the morbidity and mortality rates among the patients who underwent elective surgery probably due to the early diagnosis coupled with a multidisciplinary approach. In developing countries like India, early transfer of jaundiced pregnant women to a tertiary centre can go a long way in lowering the maternal morbidity and mortality.

END NOTE

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Editor's Remarks: Maternal mortality is an issue bringing great distress to the family and the treating physician alike. It is also an issue with political relevance since public health statistics needs a lower MMR each year. Jaundice in pregnancy is an area that needs more attention. This original study attains importance due to this

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