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SAVING LIVES WITH MULTIDISCIPLINARY CARE OF DIABETIC KETOACIDOSIS IN PREGNANCY- A CASE REPORT

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ABSTRACT Diabetic Ketoacidosis (DKA) in pregnancy has serious implications on maternal and fetal outcomes. Increased incidence of diabetes worldwide has led to more number of pregnancies being susceptible to this complication, necessitating a multidisciplinary team management in a critical care setting. There are several challenges with respect to diagnosis and management of this condition. An understanding of the physiological changes in pregnancy, the impact of precipitating events as well as patient education and emphasis on adherence to treatment are key elements in care provision. Infection and poor compliance to insulin are the most common triggers for ketoacidosis and can occur at even lower blood sugar thresholds in pregnancy. Prevention, early diagnosis, aggressive treatment and timely indicated delivery form the pillars of successful management of DKA in pregnancy. This case report demonstrates that increased awareness of DKA with immediate recognition and a successful multidisciplinary approach are mandatory for positive pregnancy outcomes.

KEYWORDS : Diabetic Ketoacidosis, pregnancy, critical care

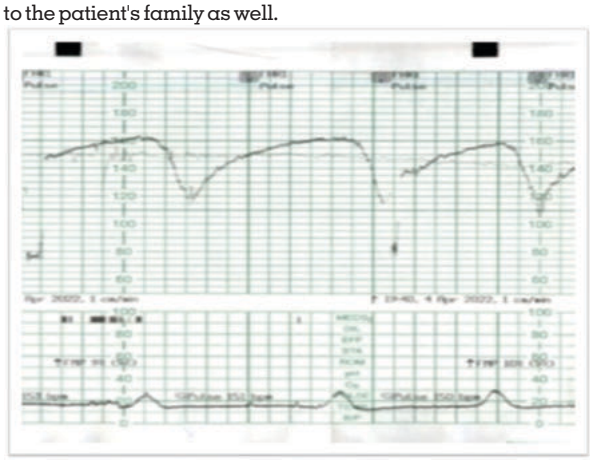
INTRODUCTION

Diabetic Ketoacidosis (DKA) complicating pregnancy has serious implications on maternal and fetal outcomes. Increased incidence of diabetes worldwide has led to more number of pregnancies being susceptible to this dreaded complication. The reported incidence of DKA in pregnancy ranges from 1% to 10% in various studies. [1] Physiological changes of pregnancy such as state of respiratory alkalosis with compensatory low bicarbonate levels affecting buffering capacity, relative insulin resistance due to increased levels of hormones like human placental lactogen, and enhanced lipolysis with elevated free fatty acids, predispose a pregnant woman with diabetes to DKA. [2] Furthermore, common events in pregnancy such as protracted vomiting, infections along with non- compliance to insulin can precipitate DKA even at lower blood sugar levels. DKA is more commonly seen in type 1 diabetes but is also observed in type 2 diabetes and rarely in gestational diabetes. [3] Early diagnosis and treatment of DKA and triggering causes are essential to prevent a stormy course and improve outcomes.

We present a case of pregnancy with Type 1 diabetes where delayed reporting of precipitating factor resulted in patient presenting with DKA and sepsis.

Case Report

A 29-year-old primigravida with type 1 diabetes of 13 years' duration, presented at 31 weeks' gestation with a three-day history of vomiting, right breast pain since two weeks and fever since one day. She had skipped meals and the last two doses of insulin due to persistent vomiting. She was admitted at 11 weeks for glycaemic control with HbA1c of 8.3%. Advise to use insulin pump due to brittle diabetes was declined and she was continued on a combination of short and long acting insulin. Poor compliance with the medications and monitoring was reflected in the uncontrolled sugars. Fetal ultrasound showed averagely growing fetus. On examination at admission, she was febrile, tachycardic, tachypneoic and dehydrated. Local examination of right breast showed an abscess with surrounding tissue engorgement. Fetal heart sounds were heard. Investigations revealed GRBS 222 mg/dl, urine ketones 3+, pH 7.313, serum bicarbonate 9.9 mmol/L, serum potassium 3.3 mmol/L, serum creatinine 0.8 mg/dl and WBC of 25000. Diagnosis of DKA was confirmed and patient was shifted to the Intensive Care Unit for multidisciplinary team management. Resuscitation was done with intravenous fluids, insulin infusion, potassium correction, antibiotics and supplemental oxygen as per protocol. Incision and drainage of the breast abscess was performed under local anaesthesia and higher antibiotics were given as per the pus culture report of streptococcus. Urine and blood cultures were negative. Non- stress test for the fetus (figure 1) was non-reassuring but the focus was on maternal stabilisation which was conveyed to the patient's family as well.



Despite these measures and control of blood sugars, the patient's general condition continued to deteriorate with worsening acidosis. She was intubated and electively ventilated and invasive hemodynamic monitoring was done. Further downslide was reflected in maternal hypotension, and vasopressors were added with initial noradrenaline infusion with incremental doses and then vasopressin as poor response. Diagnosis of DKA in refractory septic shock necessitated the decision for delivery as part of maternal resuscitation. Emergency preterm caesarean section was done under general anaesthesia and a live baby girl weighing 1.6 kg was delivered with APGAR 5/6/6 and arterial cord pH of 7.1. Baby was admitted to the neonatal intensive care unit for further management. Intraoperative, patient had atonic postpartum haemorrhage which was medically managed. The improvement in maternal parameters was evident as soon as the baby was delivered with rising blood

pressures and improvement in tachycardia. Further postoperative course was uneventful and the vasopressors were tapered and stopped the next day of surgery and she was extubated. Blood sugars were high until 48 hours and insulin infusion was continued and then switched over to subcutaneous insulin. Fever resolved with the antibiotic cover and daily dressing of breast abscess. Post-operative haemoglobin was 8.7 mg/dl and oral iron supplements were initiated. Abdominal wound healed well and the mother was discharged on sixth post-operative day. Daily dressing of abscess continued for a month till complete healing of the wound. Baby's course in NICU was also uneventful and was discharged for home care.

DISCUSSION

DKA in pregnancy is an obstetric emergency needing a multidisciplinary team in a setting of critical care to provide optimum treatment. [4] Understanding of the physiological changes in pregnancy and the impact of precipitating events is essential to the management. DKA in pregnancy can occur at less than the defined blood sugar thresholds and can progress more rapidly with even small insults as compared to non-pregnant women. [5] The most common precipitating factors for DKA are infection related illnesses and non-compliance to insulin. Infection further reduces glucose utilisation thus exacerbating the hyperglycaemia. [6]

Identifying the trigger at the earliest will prevent the shift into ketoacidosis. Antenatal breast abscess is uncommon but in our case was the sole source of infection. This was missed as patient did not report the breast pain and lump in the prior antenatal visit. Another key element of prevention is patient education. Adequate pre-conception counselling, importance of compliance with diet and insulin therapy, regular antenatal visits and home blood sugar monitoring as well as knowledge of precipitating factors and sick day rules must be integrated in the education. [7] In cases with brittle diabetes, insulin pump is ideal. For non- compliant patients, combined counselling with the obstetrician, endocrinologist and nutritionist can drive home the point. Fetal monitoring in DKA is a challenge as maternal acidosis results in fetal acidosis which is in turn reflected as non-reassuring fetal heart trace. But doing a caesarean section at this point will worsen her condition. Therefore, until maternal stabilisation, her well-being takes precedence over that of the fetus. [7] In some cases with refractory shock, such as ours, delivery itself will improve cardiac output, lung mechanics and reduce oxygen demand, thus becoming a part of maternal resuscitation.

In summary, prevention, early diagnosis, aggressive treatment and timely indicated delivery form the pillars of successful management of DKA in pregnancy (table 1).

Table 1: Principles of care in Diabetic Ketoacidosis in Pregnancy.

Pre-pregnancy counselling and patient education
Compliance to treatment and glycaemic control
Follow sick day rules as per protocol
Identification and treatment of precipitating factors
Multidisciplinary team care
Management in ICU setting • Aggressive hydration • Intravenous insulin therapy • Electrolyte correction • Evaluate need for bicarbonate correction
Maternal and fetal monitoring
Timely decision for delivery if indicated

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