

Case Report

Ketoacidosis as a presenting symptom of diabetes in a eighteen month old infant: a case report

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ABSTRACT

There is a world-wide trend in rise of diabetes cases. There is also rise in the trend of any one person getting diabetes at an early age. However, diabetes is fairly less common in children less than 5 years. The manifestation of diabetes too can be peculiar in very young children. Then managed as per standard protocol, results can be rewarding. Ours is secondary healthcare facility with all diagnostic equipment and consultants available round the clock. Authors describe one case finding of diabetic ketoacidosis. The baby aged 18 months presented with cold, cough, fever and air hunger (breathing deeply), referred by family doctor. The prompt diagnosis, rehydration, insulin infusion helped in recovery. Complete blood tests confirmed the presence of random blood sugar 345mg%, pH 7.05, Ketone bodies present in urine. While there was Leukocytosis, tests for Dengue Fever and Typhoid were negative. Identification of ketoacidosis and prompt treatment can save children.

Keywords: Air hunger, Challenges, Difficulties, Random blood sugar

INTRODUCTION

Authors in the south East Asian region are familiar with diabetes. The trend of diabetes in adults is increasing and showing a tendency to occur in early adulthood. The occurrence of diabetes in children is known, less common but showing again a tendency to increase. In this country there are 1,00,000 children living with diabetes. The disease usually peaks in the age group 12-14 years.¹ The diabetes scenario in children, especially young less than 5 years can be challenging in diagnosis and management. The danger and difficulty in Diabetic Ketoacidosis is their relatively low incidence and nonspecific symptoms in an unsuspecting scenario which may not trigger the suspicion. The very young babies cannot express their illness, classical manifestations like increased hunger,

increased thirst, may be difficult to elicit and complications like ketoacidosis are more common but less well appreciated!²

Authors describe the experience of one young female baby aged 18 months presenting with air hunger along with cold cough, referred by their family doctor.

METHODS

Authors have taken permission from this Ethics Committee to share this finding while keeping anonymity of this child patient. Ours is a secondary healthcare facility equipped diagnostic facility and consultant pediatricians available round the clock. On any average day 50-60 children, 70% of them younger than 5 years

attend this outpatient services, 10-12 patients are admitted daily. Authors have pediatric intensive care unit to cater to the needs of severely ill children. Authors also have well equipped diagnostic laboratory facility. The commonest presenting symptoms are cold, cough, fever, difficulty in breathing, diarrhea, vomiting, jaundice, seizures, poisoning, accidental injuries and birth defects.

RESULTS

Healthy parents in their late 20's, no consanguinity, first conception, antenatal period uneventful, labor pains set in earlier to expected due date and baby born normal vaginal delivery, 1-week pre-term. Baby weight at birth 3.6 Kg. The baby's first day, first 1 week, first month, first year, healthy except minor fever, cold, cough 3 times, managed by the family doctor. The baby had breast feeding, normal weaning with usual family food items, routine immunizations and breast feeding continued even now. The baby growth and developmental milestones are normal. The baby weighs 10 Kg. This time around baby had cold, cough, fever did not respond to routine medicines but progressed to difficulty in breathing, baby irritable, crying, and refusing to feed.

On presentation at Emergency department the child weighed 10 Kg, was mildly drowsy, febrile (38.1°C) pulse rate was 147 beats/min, respiratory rate was 50 breaths/min, extremities were warm, and some pallor was noted with no jaundice. Cardiovascular examination revealed normal heart sounds with no murmur, respiratory examination revealed air hunger, acidotic breathing ++? kussmaul's breathing Mild crepitations heard SCR +, and abdominal examination revealed normal findings, CNS- oriented, responds to mother.

Capillary random blood glucose at admission showed (Table 1) high blood glucose (345mg%). SpO₂- 99% on O₂ by nasal prongs, CFT <3sec, Venous blood gas analysis revealed pH of 7.01, pCO₂ 8 mmHg, pO₂ 67 mmHg, sodium 134 mmol/L, potassium 3.2 mmol/L, and HCO₃ 2.6 mmol/L. Dipstick urinalysis showed glucose 3+, ketone 2+, The final diagnoses was diabetes mellitus with diabetic ketoacidosis

Plan of action

- O₂ by nasal prongs
GRBS testing, Urine tests
Followed by IVF
- IVF NS bolus 200ml over 30 mins

Daily notes

The baby was admitted in intensive care unit, IVF bolus given and oxygen supplementation by nasal prongs started.

HbA1C was found to be 8.2%.

Inj INSUGEN 40units in 40ml NS at the rate of 1ml/hr added. GRBS was to be monitored hourly. 10 units of KCL was added to IVF (Sr Potassium- 4.1) Inj NaHCO₃ initiated at 40mg in the first hour followed by 40mg over the next four hours.

ABG was repeated (Table 2) which showed values of pH 7.15 with HCO₃ -2.9mmol/L. GRBS- 209mg/dl.

Initial lab results showed leucocytosis with TC- 26400. The patient was started on broad spectrum antibiotic Inj ceftriaxone 50mg/kg BD.

The baby made remarkable improvement, less irritable, amiable, breathing comfortably. Inj insulin was continued with following instructions

- If GRBS <150 switch IVF to DNS
- If GRBS <150 reduce IV insulin to 0.7mh/hr

Laboratory results

Various blood tests done at admission confirmed: Hyperglycemia, Ketoacidosis, Raised HBA1C and raised CRP, Leucocytosis, Platelets normal, Negative for Salmonella Infection and Dengue Fever.

Repeat tests at discharge showed: Normoglycemia, No Ketoacidosis.

Table 1: Results showing various test reports.

Test	Value	Normal range
Random Blood Sugar	GRBS 345mg%	High Blood Sugar
HBA1C	8.2	Abnormal
Urine for ketone bodies	Ketone bodies present	Abnormal
Sodium	134mEq	Normal
Chloride	106mEq	Normal
Potassium	4.1mEq	Normal
Bicarbonate	2.6	Less
pCO ₂	9.2	Low
pH	7.01	Acidic
pO ₂	160.6	Raised
CRP	15MG/DL	Raised
Blood count	Neutrophils count 77% Lymphocytes 19% Eosinophils 3%, Monocytes 1%	Leucocytosis
HB	7.8Grams%	Anaemia
Platelets	1.63 lakhs/cmm	Normal
Widal	Negative	Normal
Serum test for dengue fever	Negative	Normal
Thyroid profile	T3 61 T44.7 TSH 1.02	Normal limits

Table 2: Various Serum test reports at discharge.

Test	Value	Normal Range
Random Blood Sugar:	GRBS 209mg%	Blood Sugar raised
HBA1C	8.2	Abnormal
Urine for Ketone bodies	Ketone bodies absent	Normal
Sodium	134mEq	Normal
Chloride	106mEq	Normal
Potassium	4.1mEq	Normal
Bicarbonate	18mEq	Normal
pCO2	35	Normal
pH	7.20	Normal
pO2	160.6	Raised
CRP	15MG/DL	Raised
Blood Count	Neutrophils count 77% Lymphocytes 19% Eosinophils 3%, Monocytes 1%	Leucocytosis
HB	7.8Grams%	Anaemia
Platelets	2.03 lakhs/cmm	Normal

DISCUSSION

The literature review is quite interesting. This country is in bounty with plenty of food, milk, Fish, Meat products, improved living conditions, better transport and added social support. This has impacted the transition of disease pattern. The earlier ones like Malaria, Cholera, Typhoid are less severe, while Hypertension, Diabetes, Substance abuse, Cancers are on the rise. Diabetes used to be more common in persons in their 60's but the trend is altered to early 30's age. Diabetes has become most common disease with at least one person in every 3 families.³ Diabetes is seen in all ages however fairly uncommon in infants and young preschool children. If at all diabetes is detected at a younger age it gives big challenge to the baby, parents and care giver alike.⁴ Unlike in adults the manifestations of diabetes are different, the classical increased thirst/increased hunger may not be present but more often complications like Ketoacidosis.⁵ The frequency of diabetes in young infants and children is 1-4 per one Lakh live births.^{6,7} India has 1 lakh children having diabetes at any one time and add 10,000 new patients every year. The respiratory tract infections, Diarrhoea, Dysentery, intestinal worms, vitamin deficiency, and malnutrition are of common occurrence in young infants and preschool children. The respiratory tract infections are quite common in children aged 2 months 60 months, in India.⁸⁻¹⁰ The parents in general are used for herbal medicines or take babies to untrained care givers.^{11,12}

In this baby patient authors were caught unawares with diabetes manifesting in complication an unusual scenario, taxing for parents and nursing staff alike. Diabetes

manifesting as ketoacidosis, its identification and prompt management is crucial.¹³⁻¹⁵

Authors have reported one such patient experience. The prompt initiation of Insulin, rehydration, antibiotics corrected the clinical picture, the baby was able to take routine food, amiable, normal respiration and playful.

CONCLUSION

The respiratory infections are commonest in very young babies, however respiratory distress need to be identified and possible diagnosis of diabetic ketoacidosis to be kept in the back of mind.

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