Case Report

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

Amrita Mohan1*, Sunkad M. A.2, Javali S. B.2, Sowmya Vernekar3, Shilpa Hidakal2

1Department of Paediatrics, Vithal Children’s Hospital and Institute of Child Health, Dharwad, Karnataka, India
2Department of Community Medicine, 3Department of Paediatrics, USM-KLE-International Medical Program, Belgaum, Karnataka, India

Received: 05 February 2020
Revised: 11 February 2020
Accepted: 02 March 2020

*Correspondence:
Dr. Amrita Mohan,
E-mail: amy.mohan22@gmail.com

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. 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!

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
**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 ++? kussmual’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                  |
| pCO2                  | 9.2     | Low                   |
| pH                    | 7.01    | Acidic                |
| pO2                   | 160.6   | Raised                |
| CRP                   | 15MG/DL | Raised                |
| Blood count           | Neutrophils count | Leucocytosis          |
|                       | 77% Lymphocytes | 19%Eosinophils 3%,   |
|                       | 19% Eosinophils 3% | Monocytes 1%          |
| 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         |
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.

ACKNOWLEDGEMENTS

Authors acknowledge the excellent care of nursing staff, timely Laboratory services in the Children’s Hospital. Authors also acknowledge the co-operation and help of baby and her parents who participated in this case report.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not Required

REFERENCES

1. Prasad D, Awasthi S. A retrospective case study of clinical profile of hospitalized children with type 1 diabetes mellitus at a tertiary health care center in northern India. Clin Epidemiol Global Heal. 2013 Dec 1;1(3):137-41.
2. Varadarajan P, Sangaralingum T, Senniappan S, Jahnvi S, Radha V, Mohan V. Clinical profile and outcome of infantile onset diabetes mellitus in southern India. Ind Pediatr. 2013 Aug 1;50(8):759-63.
3. Sunkad MA, Javali SB, Sulikeri PN, Rajendra A. A cross sectional study of Screening for hypertension, diabetes and connectivity in the rural population of North Karnataka, India. Int J Res Health Allied Sci 2018;4(4):17-22.
4. Huang K, Liang L, Fu JF, Dong GP. Permanent neonatal diabetes mellitus in China. BMC Pediatr. 2014 Dec 1;14(1):188.
5. Arce KM, Pantalone KM. Not all diabetes in infants is type 1: a case report. Diabetes Therapy. 2016 Jun 1;7(2):369-75.
6. Kumar KM. Incidence trends for childhood type 1 diabetes in India. Ind J Endocrinol Metabolism. 2015 Apr;19(Suppl 1):S34.
7. Akinola IJ, Odusote OA, Oduwole AO. Neonatal Diabetic Ketoacidosis in a Nigerian Infant: A Case Report. Nig J Hosp Med. 2015 Apr-Jun;25(2):139-41.
8. Sood S, Landreth H, Bustinza J, Chalmers L, Thukaram R. Neonatal diabetes: case report of a 9-week-old presenting diabetic Ketoacidosis Due to an activating ABCC8 gene mutation. J Invest Medic
9. Fredrick F, Sawe H, Maze K, Mally D, Majaliwa E. A seven weeks old baby with diabetic ketoacidosis: a case report. Clin Case Reports. 2016 Feb;4(2):147-50.
10. Sharma D, Kuppusamy K, Bhoorasamy A. Prevalence of acute respiratory infections (ARI) and their determinants in under five children in urban and rural areas of Kancheepuram district, South India. Ann Trop Med Public Health. 2013 Sep 1;6(5):513-8.
11. Walke SP, Das R, Acharya AS, Pemde HK. Incidence, pattern, and severity of acute respiratory infections among infants and toddlers of a peri-urban area of Delhi: a 12-month prospective study. Inter Scholarly Resea Notice. 2014;2014.
12. Mohanraj R, Kumar S, Jayakumar S, Agarwal M, Dhingra B, Jeyaseelan V, et al. Where do mothers take their children for pneumonia care? Findings from three Indian states. PloS one. 2019;14(4).
13. Ramani VK, Pattanakar J, Putthomnappa SK. Acute respiratory infections among under-five age group children at urban slums of gulbarga city: A longitudinal study. J Clin Diagn Research: JCDR. 2016 May;10(5):LC08.
14. Jayashree M, Sasidharan R, Singh S, Nallasamy K, Baalaaji M. Root cause analysis of diabetic ketoacidosis admissions at a tertiary referral pediatric emergency department in North India. Ind J Endocrinol Metabol. 2017 Sep;21(5):710-4.
15. Katte JC, Djoumessi R, Njindam G, Fetse GT, Dehayem M, Kengne AP. New-onset diabetic ketoacidosis in a 13-months old african toddler: a case report. Pan African Med J. 2015;22(1)293.

Cite this article as: Mohan A, Sunkad MA, Javali SB, Vernekar S, Hidakal S. Ketoacidosis as a presenting symptom of diabetes in a eighteen month old infant: a case report. Int J Contemp Pediatr 2020;7:948-51.