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# Diabetic Ketoacidosis Misdiagnosed as Ectopic Gestation in an 18-Year-Old Ghanaian: A Case Report

**Emmanuel Ameyaw<sup>1</sup>, Nana Ama Barnes<sup>2</sup>, Deborah April Amakye Ansah<sup>1</sup> and Rita Ameyaw<sup>3</sup>**<sup>1</sup>Department of Child Health, Komfo Anokye Teaching Hospital, P. O. Box 1934, Kumasi, Ghana<sup>2</sup>Department of Internal Medicine, Effia Nkwanta Regional Hospital, P O Box 229, Sekondi, Ghana<sup>3</sup>Nursing and Midwifery Training College, P. O. Box 110, Kumasi, Ghana**Corresponding author:** Emmanuel Ameyaw, Department of Child Health, Komfo Anokye Teaching Hospital, P. O. Box 1934, Kumasi, Ghana, Tel: 233208403784; E-mail: ekameyaw@yahoo.com**Rec date:** Apr 26, 2017; **Acc date:** May 18, 2017; **Pub date:** May 22, 2017**Citation:** Ameyaw E, Ama Barnes N, April Amakye D, et al. Diabetic Ketoacidosis Misdiagnosed as Ectopic Gestation in an 18-year-old Ghanaian: A Case Report. Cell Mol Med 2017, 3:2.

## Abstract

Diabetic ketoacidosis (DKA) is the most frequent hyperglycemic acute diabetic complication of type 1 diabetes. It carries a significant risk of death especially in Africa where there is usually late presentation and misdiagnosis and mismanagement are more frequent. All physicians, irrespective of discipline and level of practice, should be able to diagnose DKA early and initiate prompt management to optimize the chances of survival.

**Keywords:** Misdiagnosis; Ectopic gestation; Diabetic ketoacidosis; Laparotomy

## Introduction

Diabetic ketoacidosis (DKA) is defined by blood glucose concentrations >11.0 mmol/L, venous blood pH<7.3, bicarbonate <15 mmol/L, glycosuria, ketonemia and ketonuria [1,2]. The clinical features of DKA are non-specific and patients may present with nausea, vomiting, poor feeding, weakness, polyuria, polydipsia, abdominal pain and weight loss [2-4].

DKA among children and adolescents in Ghana and other parts of Africa is often misdiagnosed because clinical features usually mimic infectious diseases, surgical emergencies such as acute abdomen, bowel perforation, appendicitis and ruptured ectopic pregnancy [5-8].

DKA is potentially a life threatening acute complication of T1D which is an important cause of morbidity and mortality in Africa. Misdiagnosis will lead to mismanagement which may result in complications including mortality.

We present a Ghanaian teenager who presented with DKA to a hospital in Ghana but was rather misdiagnosed and managed as an ectopic gestation which resulted in mortality.

## Case Report

An 18-year-old female presented to a regional hospital with 3-month history of weight loss, 2 months of amenorrhea and 2 days of severe abdominal pain, vomiting and bodily weakness. Urine pregnancy test (UPT) was positive, so the attending doctor made a diagnosis of ectopic pregnancy. Sexual history revealed that she was a virgin which was disregarded. She was not known for any chronic disease.

On examination, she was restless, wailing in pain, looked dehydrated. All other systems were normal. Blood pressure was 110/70 mmHg, pulse was 100 per minute. With the history of amenorrhoea and positive UPT she was prepared for laparotomy. She was initially resuscitated with 2L each of Normal saline, Ringers Lactate and 5% Dextrose Saline. At laparotomy uterus, tubes and ovaries were found to be normal. The doctors then checked blood glucose and it was >33.3 mmol/L. She was then suspected to have DKA from undiagnosed diabetes mellitus and she was quickly closed up and sent to the ward to be managed as such. At this point a retrospective history from a sister revealed polyuria, polydipsia and polyphagia preceding weight loss. She was kept nil by mouth and put on intravenous (IV) normal saline (NS) and hourly intramuscular (IM) regular insulin. She was also put on IV Metronidazole, Gentamicin and Ciprofloxacin. Daily wound dressing was done. She developed fever 2 days post operatively. Blood glucose remained persistently high despite hourly IM regular insulin. She died five days post operatively.

## Discussion

DKA, in a resource limited setting such as Ghana, is diagnosed based on clinical features such as polyuria, polydipsia, polyphagia, weight loss, nausea, vomiting and abdominal pains, decreased loss of consciousness and weakness as well as biochemical evidence of hyperglycemia, usually >13.9 mmol/L, venous blood pH<7.3, bicarbonate <15 mmol/L, glycosuria, ketonemia and ketonuria [2-4,9]. Important investigations such as blood gases and blood ketones [2,9] are almost nonexistent at the district and

regional hospitals of Ghana but may be restricted to some teaching hospitals where they are seldom being done due to lack of appropriate reagents.

a combination of sensitive urinary pregnancy tests (UPT), transvaginal ultrasound (TVUSG) and serum hCG estimations and clinical features of vaginal bleeding, abdominal pains and vomiting [7,10,11]. The patient was misdiagnosed as ectopic gestation based on history of 2 months of amenorrhoea, abdominal pain, vomiting and positive pregnancy test. These clinical features are also common with DKA and hence the misdiagnosis of ectopic gestation. She did not have previous history of diabetes and so she was not on insulin management. Oligomenorrhoea and amenorrhoea are common in women with diabetes who are not diagnosed and so not on insulin or who have been diagnosed but poorly managed [8]. It cannot be explained why the UPT was positive except it was due to possible observer error or that the strips had expired. For this patient who insisted that she was a virgin, further investigations for diagnosing ectopic gestation such as TVUSG and serum hCG estimations, which are more specific than UPT, should have been done.

It is more likely she developed infection by evidence of fever. This was compounded by inability of the medical team to control the blood glucose. And so, ketoacidosis from uncontrolled lipolysis compounded by possible lactic acidosis from possible septicaemia caused refractory response to the insulin management. Patient with diabetes are more susceptible to infections due to defective host response to neutrophil chemotaxis, adhesion and intracellular killing. There is also defect in humoral immunity [12]. Therefore, in this patient with poor blood glucose control gram negative bacterial infection was possible. Blood culture and wound swab culture and sensitivity were necessary to direct antibiotics management but these investigations could not be done at the hospital. Higher doses of insulin were necessary to control blood glucose [12]. and more potent antibiotics to control possible gram negative bacterial infection and/or septicaemia but this was also not done.

## Conclusion

DKA among children and adolescents in Ghana can easily be misdiagnosed because clinical features can mimic other acute diseases. Laboratory support is nonexistent or poorly available in many hospitals in Ghana. Many hospitals do not readily have glucose meters and strips and so blood glucose testing is usually omitted. All doctors, irrespective of discipline and level of practice, whether in primary, secondary or tertiary care institutions, should be able to diagnose DKA and initiate appropriate management to improve upon chances of survival.

## Recommendation

Any child or adolescent with acute disease, for any diagnosis whatsoever, should have blood glucose tested to rule out diabetes. Frequent and periodic continuous professional development for doctors and health professionals and community awareness education should be organized.

## Conflict of Interest

Authors declare no conflict of interest

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