

Diabetic ketoacidosis in southern Jordan: five-year experience

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الحماض الكيتوني السكري في جنوب الأردن: خبرة خمس سنوات

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خلاصة: تم تحليل سائر حالات الحماض الكيتوني السكري التي أدخلت مستشفى الأمير زيد بين سنة 1993 وسنة 1997 بحثاً عن الأسباب المعجلة بحدوث هذه الحالات وعن عواقبها. ومن بين 167 حالة، كان 89 من الذكور و78 من الإناث. وكان العمر الأوسط بينهم 38 سنة. لقد كان الحماض هو المظهر الأرتلي للسكري في 21% من المرضى. وكانت أهم الأسباب المعجلة بحدوث الحماض هي العدوى وعدم الامتثال لتعليمات المعالجة. ولكن لم يوجد أي سبب في 14% من الحالات. وقد بلغ معدل الوفيات 4.8% وخلاصة القول إن تثقيف الجماهير والمرضى حول مضاعفات السكري ومعالجته، هو مفتاح الوقاية من الحماض الكيتوني السكري.

ABSTRACT All cases of diabetic ketoacidosis admitted to Prince Zaid Hospital between 1993 and 1997 were analysed for precipitating causes and outcome. Of 167 cases, 89 were male and 78 female, with a mean age of 38 years. It was the initial presentation of diabetes mellitus in 21% of the patients. Infection and noncompliance were the leading precipitating causes but no cause was found in 14% of the patients. The mortality rate was 4.8%. Educating the public and patients about diabetic complications and therapy is the key to prevention of diabetic ketoacidosis.

L'acidocétose diabétique dans le Sud de la Jordanie: expérience sur cinq ans

RESUME Tous les cas d'acidocétose diabétique admis à l'Hôpital Prince Zaid entre 1993 et 1997 ont été analysés à la recherche des causes déclenchantes et de l'issue. Sur 167 cas, 89 étaient des hommes et 78 des femmes, l'âge moyen étant de 38 ans. Il s'agissait de la première manifestation de diabète sucré chez 21% des patients. L'infection et la non-observance étaient les principales causes déclenchantes mais aucune cause n'a été trouvée chez 14% des patients. Le taux de mortalité était de 4,8%. L'éducation du public et des patients en ce qui concerne les complications diabétiques et le traitement constitue la clé de la prévention de l'acidocétose diabétique.

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Introduction

Prince Zaid Hospital is the only hospital in the Tafila area of southern Jordan and serves approximately 60 000 people. Diabetes mellitus is a common problem in Tafila, as in other parts of the country. Various studies estimate its prevalence at more than 10%. One of its potentially preventable but dangerous complications is diabetic ketoacidosis. Early diagnosis and proper management can prevent possible death [1].

The aim of our study was to analyse the cases of diabetic ketoacidosis in order to prevent the development of this condition.

Patients and methods

This was a retrospective study of 167 cases of diabetic ketoacidosis admitted to the internal medicine section of Prince Zaid Hospital between January 1993 and December 1997.

The criteria for inclusion in the study [2,3] were:

- Hyperglycaemia with a sugar reading ≥ 200 mg/dL (about 12 mmol/L or more)
- Acidaemia as estimated by a blood pH < 7.3
- Serum bicarbonate < 15 mmol/L
- Presence of ketonaemia with no other causes of metabolic ketoacidosis.

All the patients were analysed for:

- history of diabetes mellitus
- type of diabetes mellitus, i.e. type 1 versus type 2
- age and sex
- duration of diabetes mellitus
- precipitating cause, when known
- number of admissions with diabetic ketoacidosis for a given patient

- total number of admission days
- condition at discharge.

Results and discussion

Of the 167 patient records which fulfilled the criteria, 89 were male and 78 female, with a mean age of 38 years (Table 1). In all, 35 patients (21%) had not been diagnosed with diabetes mellitus before, and so diabetic ketoacidosis was their initial presentation. Of the remaining 132 patients, 23 (17%) were non-insulin dependent. As regards previous episodes of diabetic ketoacidosis, 47 (28%)

Table 1 Age distribution of the patients

Age group (years)	Males		Females		Total	
	No.	%	No.	%	No.	%
14-20	7	4	5	3	12	7
21-30	39	23	28	17	67	40
31-40	6	4	15	9	21	13
41-50	2	1	10	6	12	7
51-60	19	11	13	8	32	19
>60	16	10	7	4	23	14
Total	89	53	78	47	167	100

Table 2 Duration of diabetes mellitus in patients with diabetic ketoacidosis

Duration (years)	No.	%
First diagnosed	35	21
<1	41	25
1-5	29	17
6-10	14	8
11-15	22	13
>15	26	16
Total	167	100

Table 3 Initial sugar readings of the patients with diabetic ketoacidosis on admission

Sugar (mg/dL)	No.	%
200-300	31	19
301-400	47	28
401-500	62	37
> 500	27	16
Total	167	100

of the 167 patients had been admitted more than once with the condition, with a mean of 2.7 times. Data on duration of diabetes and initial sugar readings are given in Tables 2 and 3.

History, clinical examination, laboratory data, electrocardiogram and radiological investigations were analysed for precipitating causes of the ketoacidosis. In 24 patients (14%), no specific cause was found. Table 4 shows the precipitating causes in the remaining 143 patients, with some patients having more than one cause. The duration of admission was related to the underlying cause. It should be mentioned that 18 patients developed one or more episodes of diabetic ketoacidosis during hospitalization. The average number of days of hospitalization were 3.44 with a range of 2-31 days, which is comparable with other studies [3-5].

The mortality rate was 4.8%, the causes being septicaemia in 3 patients, pulmonary embolism following a hip fracture in 1 patient, stroke in 2 patients, meningitis in 1 patient and unknown cause in 1 patient.

Table 4 Precipitating causes of diabetic ketoacidosis

Cause	No.	%
Infection	72	43
Urinary tract	31	
Diabetic foot	17	
Respiratory tract	10	
Gastroenteritis	5	
Gall bladder	2	
Central nervous system	1	
Others	6	
Problems with treatment	88	53
Poor compliance	67 ^a	
Refusal of insulin	21	
Cardiovascular	17	10
Angina pectoris	13	
Myocardial infarction	3	
Arrhythmias	1	
Post-surgical	10	6
Cerebrovascular accident	5	3
Fractures (hip)	2	1
Others	7	4
No cause found	24	14

^a35 were diagnosed with diabetes for the first time. In some patients there was more than one precipitating cause.

Conclusion

Diabetic ketoacidosis is a potential killer. Our study shows that infections and treatment problems, mainly poor compliance, were the leading precipitating causes. Education is therefore vital to prevent lethal complications.

References

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Diabetes control

The scale of the problem that diabetes poses to regional health is still widely under-recognized and presents a daunting public health challenge. Recent estimates predict that if current trends continue, the number of persons with diabetes will more than double, especially in the less developed countries of our Region.

Source: The work of WHO in the Eastern Mediterranean Region. Annual Report of the Regional Director. 1 January-31 December 2000. Page 156.