

The management of diabetic ketoacidosis in the UK in 2014: Results of a national survey



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Diabetic ketoacidosis (DKA) is the hallmark of absolute insulin deficiency, occurring most frequently in people with type 1 diabetes, or occasionally in people with ketosis-prone type 2 diabetes. Prior to the discovery of insulin in 1922, DKA was universally fatal within a couple of years of diagnosis. With the discovery of insulin in 1922, life for people with diabetes changed almost overnight (Banting, 1922). The history of how the management of DKA has changed over the years has been documented elsewhere (Dhatariya, 2015); however, until recently there has not been a consistent definition of the condition, nor, more importantly, a recognised and accepted way of treating it.

Between the 1980s and early 2000s, it was a common occurrence that registrars in diabetes, upon arrival in a new hospital, were told to “re-write the DKA guideline”. There was little explanation as to why, or what was wrong with the old one, but it was almost a rite of passage to have to do it. What was clear at the time was that there were little data to support what was happening, and little or no data to show what was being done was correct. There were data to show that fluid, insulin and potassium were the cornerstones to managing DKA, but no consistency as to how much or how fast. Even with a fairly standard regimen of intravenous insulin given at 0.1 unit/kg/hour and 1–2 litres of fluid on admission, then 1 litre every 3–4 hours, and giving potassium 20–40 mmol/hour, there was an appreciable morbidity and mortality (Carroll and Matz, 1983).

In an attempt to try and come up with a consistent approach to the management of DKA, in 2010 the Joint British Diabetes Societies (JBDS) for Inpatient Care, an organisation made up of individuals

representing Diabetes UK, the Association of British Clinical Diabetologists and the UK Diabetes Inpatient Specialist Nurse group, published their guideline (Savage et al, 2011). A questionnaire was sent out in 2012 to ask individual diabetes teams what they thought of the DKA guideline. Over 90% of respondents rated the guidance “excellent” or “good” (Sampson, 2013). As a result of new clinical data and feedback from diabetes specialist teams, the JBDS DKA guideline was then updated in 2013 (Dhatariya et al, 2013). The question still remained however; did the guidelines work?

To answer this question, a national survey was carried out between May and November 2014 asking individual teams to send back data for the next 5 people who presented with DKA at their institution. A 5-page form was used to collect detailed information about these individuals. At the same time, another questionnaire was sent out asking about the institution itself and their capacity to look after inpatients with diabetes. The data from both of these surveys have recently been published (Dhatariya et al, 2016a; 2016b).

A total of 72 hospitals returned data on 283 individuals. There were several messages in the data. Foremost among them was that “process issues” at the front door were carried out very well. The median time from admission to diagnosis was only 35.5 minutes, the time to start 0.9% sodium chloride solution (normal saline) was 6 minutes later. The time to start a fixed rate intravenous insulin infusion was 60 minutes from the time of admission and the time to biochemical resolution of DKA was 18.7 hours. There was evidence that the clinical and biochemical assessments recommended in the first 6 hours were done well. Many of these were nurse led. However,

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as time progressed and patients improved, then subsequent reassessments were carried out less well. Potassium replacement was not carried out in accordance with the guideline in over 20% of cases, and in 67% of cases potassium levels dropped to less than 4.0 mmol/L. In addition, 27.6% of individuals developed overt hypoglycaemia. From the data collected, it was impossible to know whether these biochemical abnormalities were because people were not following the guideline or whether the guideline is wrong. While there were no reports of harm (only 1 person died, many weeks after initial admission and his DKA had resolved within 18 hours of admission) there remains a question mark as to why things were not done as planned. It may be that the staffing ratio in emergency departments and acute medical units is higher than the medical wards, and thus when first admitted, the processes of care are better carried out.

As the patients improved and were moved to general medical wards, the level of monitoring declined. Was this because the patients were better and did not require intensive monitoring, or were the ward nurses too busy to provide the standard of care they would have liked to? Just under half of teams said that they had diabetes inpatient specialist nursing levels of 1 per 300 inpatient beds, as recommended by Diabetes UK and others (Diabetes UK et al, 2014), with most having a mean of 0.62 per 300 beds. Processes that required medical input were also poorly carried out. While the survey did not set out to find out why that may be, there are previous data to show that the levels of knowledge and confidence among junior medical staff is low when compared to other commonly encountered medical emergencies (George et al, 2011).

Further difficulties faced by staff included that only 76.1% of teams reported being able to test ketones at the bedside, and of those, only 74.6% had someone available 24 hours per day to do so. Also, 17.9% of teams reported that their ketone meters had no quality assurance, and 3% had none for their glucose monitors. In addition, 20.9% and 26.9% of medical and nursing staff respectively had no rolling education.

In summary, DKA is a relatively common

diabetes-related emergency. The introduction of a national guideline to help manage the condition has been broadly welcomed across the UK, with the survey showing that 80% of responding hospitals used the JBDS guideline. Despite this standardisation of practice across the UK, there remain some areas where management can be improved. What is yet to be determined is whether failings in these areas are due to failure to follow the guidelines or whether the guidelines are wrong. There also remain some institutional factors that need to be addressed. Furthermore, these were data from a small number of individuals in a large number of hospitals. Are the data applicable to a large number of individuals in any single hospital? As always, more work needs to be done to answer these questions. ■

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