

Optimising glycaemic control in preparation for elective surgery: An introduction to the benefits and challenges

Jesina Kirby

The increasing prevalence of diabetes means that more people with diabetes are likely to require surgery than those without diabetes. Healthcare professionals must, therefore, implement solutions in dealing with this growing challenge to improve surgical outcomes. This article discusses the benefits of optimising glycaemic control in preparation for elective surgery. It highlights the challenges faced by both the person with diabetes and healthcare professionals when diabetes control is suboptimal. The article illustrates how one NHS Trust has responded to this recognised problem and highlights the steps it has taken to promote earlier and safer surgery. A case report that illustrates one individual's perspective is included.

Optimal glycaemic control in preparation for elective surgery is paramount in order to reduce peri- and post-operative complications of diabetes (Frisch et al, 2010). Poor glycaemic control is associated with increased post-operative complications, mortality, and a longer length of stay (Association of Anaesthetists of Great Britain and Ireland [AAGBI] and the Joint British Diabetes Societies [JBDS] Inpatient Care Group, in press). This subsequently impacts on the lives of people with diabetes and has financial implications for healthcare providers. Ideally, glycaemic control should be optimised in primary care before people are referred for surgery, to prevent any delays or cancellations. However, when this is not possible and when complex management may be required, then referral to a diabetes specialist team should be considered (NHS Diabetes, 2011).

Background

There are at least 3.3 million people with diabetes in the UK at present and this figure is likely to rise to five million by 2025 (Diabetes UK, 2015). This rising

incidence of diabetes means more people with diabetes are likely to require surgery. Not only do they face surgery for common problems such as orthopaedic, abdominal and vascular problems, but they are likely to require surgical procedures that may be the result of the long-term complications of diabetes, which include heart disease, stroke, retinopathy and nephropathy. Such procedures include renal transplants, amputations, cardiovascular procedures and so on (AAGBI and JBDS, in press; Frisch et al, 2010). Alarming, perioperative mortality rates are 50% higher in people with diabetes than those without diabetes (AAGBI and JBDS, in press)

Current recommendations from the NHS Diabetes (2011) stipulate that all people with poor glycaemic control who have planned surgery should be considered for referral to a diabetes specialist team to optimise control. Therefore, referrals should be made early to make the best use of time leading up to surgery. An HbA_{1c} of less than 69 mmol/mol (8.5%) is considered safe for surgery (AAGBI and JBDS, in press). A short starvation period and good glycaemic control is the preferred strategy for managing surgical

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Article points

1. Hyperglycaemia is associated with increased postoperative infections, poor wound healing, acute renal failure, and possibly mortality.
2. Close collaboration between pre-assessment units and diabetes specialist teams is desirable if surgical outcomes are to improve.
3. All diabetes specialist teams must have an agreed protocol in the management of diabetes to reduce any variations in care.
4. Optimal glycaemic control ensures a smooth postoperative period and a reduced length of stay.
5. Encouraging more elective day cases, rather than admissions, will reduce current ongoing bed pressures.
6. Communication and safety must be at the forefront of all management protocols.

Key words

- Communication
- Joint decision making
- Optimal glycaemic control

Authors

Jesina Kirby is DSN, Western Sussex Hospitals NHS Foundation Trust

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1. Good glycaemic control ensures safety during a procedure and a smooth post-operative period, and therefore, a reduced length of stay.
2. People should be given the opportunity to make informed decisions about their care and treatment, and need to liaise closely with healthcare professionals.
3. Surgery presents a unique challenge to people with diabetes as they are unable to maintain a balance between insulin and its counter-regulatory hormones.

patients (AAGBI and JBDS, in press). Capillary blood glucose levels of 6–10 mmol/L are recommended for surgery, although 4–12 mmol/L is acceptable (Dhatariya and Kilvert, 2011; NHS Diabetes, 2011). Suboptimal glycaemic control, nonetheless, must not preclude emergency surgery (AAGBI and JBDS, in press).

On expenditure, around £10 billion is spent by the NHS on diabetes each year and this figure is expected to rise to £39.8 billion by 2035/6 (Diabetes UK, 2015). Around 10–15% of the surgical population has diabetes (AAGBI and JBDS, in press). Therefore, improving surgical outcomes is likely to reduce current NHS expenditure. Healthcare professionals must therefore make practical changes in managing diabetes to prevent this figure from escalating.

Benefits

Good glycaemic control ensures safety during a procedure and a smooth post-operative period, and therefore, a reduced length of stay (Plodkowski and Edelman, 2001; NHS Diabetes, 2011). Optimising blood glucose levels before a procedure reduces the need for overnight admission. The AAGBI and JBDS (in press) have recommended that healthcare professionals should promote day cases (where suitable) and optimal glycaemic control is necessary to achieve this. People should be given the opportunity to make informed decisions about their care and treatment, and need to liaise closely with healthcare professionals (NICE, 2003). This encourages joint decision making and greater autonomy by ensuring that people are involved in the management of their condition.

Having optimal blood glucose control reduces the need for hospital stay. Historically, people with diabetes were admitted overnight to improve their metabolic control. This involved managing patients on an insulin infusion, which subsequently increased risk of insulin errors and suboptimal management of diabetes (NHS Diabetes, 2010). Lavies et al (2010) has suggested empowering people to self-medicate while in hospital to reduce common problems with diabetes management, such as inappropriate use of intravenous infusions, medication errors, hypoglycaemia and so on. Minimising or eliminating all the potential risks improves patient safety, increases patient satisfaction, and could potentially turn a person's hospital experience into a positive one (AAGBI and JBDS, in

press; Lavies et al, 2010; NHS Diabetes, 2010). NHS trusts should therefore be encouraging more day cases to reduce such risks, which subsequently eases the current and ongoing bed pressures (Dhatariya and Kilvert, 2011). Increasing day case surgery may release half a million inpatient bed days each year (JBDS, 2013). To improve glycaemic control, careful planning and close collaboration between patients, pre-assessment units, diabetes teams and GP practices should be the cornerstones to good patient care and a seamless process (Lavies et al, 2010).

Challenges

Studies have demonstrated that poor glycaemic control can have devastating physical, psychological and social consequences on individuals (Plodkowski and Edleman, 2001). As such, diabetes is often associated with poorer outcomes.

Surgery presents a unique challenge to people with diabetes as they are unable to maintain a balance between insulin and its counter-regulatory hormones. It is known that surgery induces a catabolic state that makes people susceptible to diabetes ketoacidosis and hyperglycaemic hyperosmolar state, particularly if they have poor glycaemic control (Plodkowski and Edleman, 2001). High blood glucose levels increase the likelihood of infection, acute renal failure, poor wound healing and mortality (Frisch et al, 2010; Lavies et al, 2010; Kwon et al, 2013). This subsequently results in an increased length of stay. Therefore, every effort should be made to control blood glucose levels before surgery to reduce this risk, and to improve the patients' outcomes.

The biggest challenge faced by healthcare professionals and patients alike, is the ability to improve diabetes control without causing hypoglycaemia. Fear of hypoglycaemia is a very common concern among people with diabetes. It is especially important to avoid this in older people, who may have fewer warning signs, and a higher risk of collapse and falls. Diabetes specialist teams must take this into account when making changes to diabetes treatments. Safety must therefore be at the forefront of all management protocols (Da Costa, 2013; Williams and Raj, 2013).

Unfortunately, the psychosocial impact of surgery is often overlooked in people with diabetes. Lack of psychologists and emotional support makes untreated depression highly prevalent in this group

of individuals. Furthermore, impending surgery can cause disabling fear, worsening depression and a total avoidance of healthcare (Zgonis and Jolly, 2004). Currently, more favourable outcomes are found in bariatric surgery, where psychological assessment is performed pre-operatively, with regular post-operative follow ups (Haslam, 2009).

General practitioners should optimise diabetes control and this can be started during regular diabetes check-ups. One retrospective study has highlighted that many people are still referred for surgery despite having inadequate diabetes control (Kaczynski et al, 2010). This study has recommended introducing quality improvement programmes, such as the “18 weeks pathway” (Kaczynski et al, 2010). Pre-assessment clinics give an excellent opportunity to identify high-risk patients and must therefore initiate a strategy to manage diabetes and other comorbidities to minimise surgical risk. Close liaison with the inpatient diabetes specialist team is desirable if this process is to be successful (NHS Diabetes, 2011). If it is not realistic to delay surgery whilst HbA_{1c} is repeated, it is worth considering optimising blood glucose readings in the pre-operative period (NHS Diabetes, 2011).

Best practice

It is vital that all surgical and diabetes teams have an agreed protocol for managing people with diabetes who are awaiting surgery. Having a protocol simply reduces any variations in the management of diabetes, thereby improving patient care (National Institute for Innovation and Improvement, 2013). The Royal College of Anaesthetists (2014) states that:

“It is essential to make the most of the time between the decision to perform surgery and the procedure itself. Delivering high quality care in this limited time frame may be challenging, but there are many examples of it in the NHS today, which show how we can modify perioperative care to the benefit of the patient and the healthcare system.”

The diabetes specialist team at Western Sussex Hospitals NHS Foundation Trust has taken practical steps to improve patient care by collaborating closely with the pre-assessment unit. This collaborative initiative allows all high-risk individuals to be identified and referred in a timely manner. It has

necessitated a review of inpatient DSN resources to enable protected time to manage this service. People are triaged within 48 hours of referral and a diabetes management plan is formulated in collaboration with the individual. Regular telephone contact is maintained between the patient and DSNs. Patients are referred back for surgery once recommended surgical targets have been achieved (see *Figure 1*). This process allows for patient-centred care, greater empowerment and promotes safer surgery (NICE, 2012). Dhatariya and Kilvert (2011) emphasise the importance of communication in the diabetes management of surgical patients. The importance of this was clearly highlighted in an inpatient audit in 2009 (NHS Diabetes, 2010).

Case study

A pseudonym has been used to protect the individual's identity. Peter is a 42-year-old gentleman. He was diagnosed with type 1 diabetes at the age of 24. He is a self-employed labourer. When Peter experiences hypoglycaemia, it takes him up to an hour and a half to recover fully; this is both challenging and dangerous to manage when he is at work and he has lost a lot of work as a result. To prevent this, Peter made the decision to run his blood glucose readings high to avoid experiencing hypoglycaemia. At referral, Peter's HbA_{1c} was 103 mmol/mol (11.6%) and had been above 86 mmol/mol (10%) for the past 10 years. When he needed to have carpal tunnel surgery, it was deferred until he had improved diabetes control. When he was seen in the pre-assessment clinic, he was immediately referred to the inpatient DSNs for advice and support.

When contacted by the DSNs, Peter was unemployed due to carpal tunnel syndrome. He had no income, he was in constant pain and was struggling to support his family financially. Peter felt hopeless. He was not monitoring his blood glucose readings and had given up any hope of having surgery. This was, unfortunately, affecting his mental health and he developed depression. Following discussion with Peter, an individualised care plan was formulated and agreed. Peter managed to maintain weekly telephone contact with the inpatient diabetes specialist team. In four weeks, his blood glucose readings improved, maintaining between 6.1–11.2 mmol/L. No further episodes of hypoglycaemia or swinging blood glucose readings were reported. As his blood

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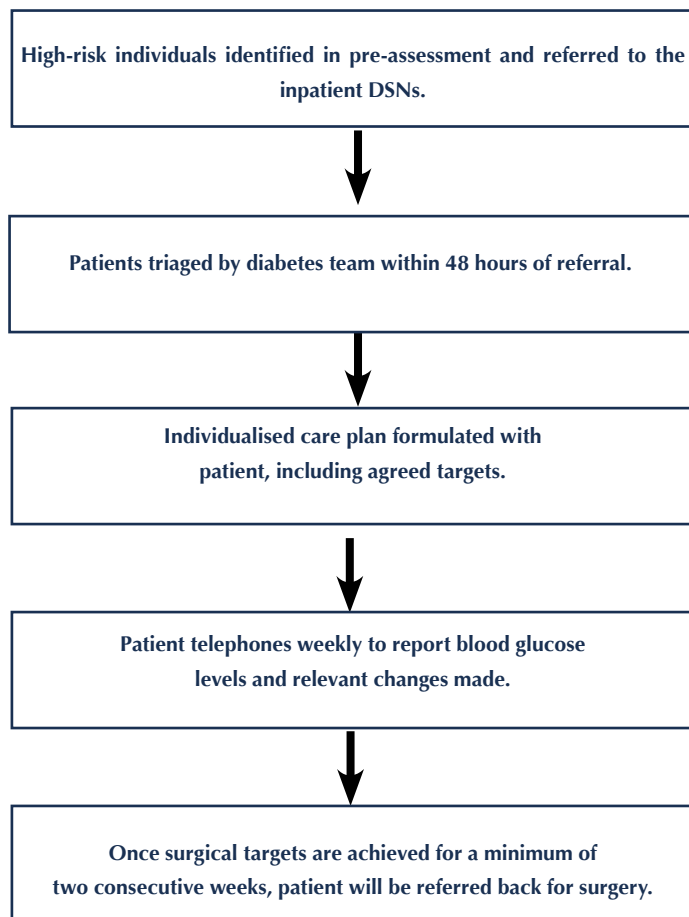


Figure 1. Pre-assessment referral to inpatient DSNs.

glucose levels remained within the recommended range, the diabetes specialist team was able to recommend surgery even though his HbA_{1c} remained above 86 mmol/mol (10%). Peter's story is not an isolated case.

Conclusion

Optimal glycaemic control is of paramount importance in reducing peri- and post-operative complications of diabetes. Ideally, diabetes should be optimised before people are referred for surgery. Good communication and close collaboration between the individuals, their diabetes teams, the pre-assessment units and the GPs is desirable in the identification and management of high-risk patients. People must be empowered in their management and must remain in the centre of all management protocols. Healthcare professionals must, therefore, make practical changes to improve surgical outcomes and potentially reduce NHS expenditure. ■

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