

## Book Reviews

**Technological advances in the treatment of type 1 diabetes**, D. Bruttomesso, G. Grassi, editors (Karger, Basel, Switzerland) 2015. 264 pages. Price: US\$ 258.00/ CHF 219.00 / EUR 205.00  
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Type 1 diabetes is an endocrine deficiency disorder, and individuals with this condition need to be on insulin lifelong. The aim of therapy is to replace insulin in a pattern mimicking natural production of insulin. This means that a background, 24 h slow release of insulin (basal insulin) is used to cover the inter-meal periods, on which is superimposed multiple boluses of insulin to counter meal-related rise in blood glucose levels. As per current knowledge, insulin treatments do not “perfectly” mimic physiological insulin release due to which, there is an interest in partnering with technology to smoothen out glucose control in these individuals. Glucose control is difficult in type 1 diabetes, as these patients are young, often children with unpredictable diet and exercise patterns, and their blood glucose levels fluctuate widely. Importantly, hypoglycaemia can occur with inappropriate insulin therapy, which can interfere with cognitive function.

It is in this light that this book is written, focusing on technological advances like insulin pump therapy and continuous glucose monitoring. The book is an up-to-date treatise on technological innovations in type 1 diabetes, and also covers next-generation technologies like the artificial pancreas, as well as mobile applications.

The first section of the book focuses on glucose control in diabetes, and covers glycaemic control in outpatient setting, in the critical care unit and during pregnancy. The next two chapters focus on self-monitoring of glucose. Following these initial chapters, the editors go on to introduce the concept of real-time

continuous glucose monitoring (CGM). Insulin pump therapy, or continuous subcutaneous insulin infusion (CSII) is covered in detail in this section. CSII is the delivery of insulin in both the basal and bolus patterns. A relatively new innovation in CSII is the low glucose suspend (LGS) technology. This technique combines the insulin pump with a CGM system. When the blood glucose falls, the insulin pump temporarily suppresses insulin release, and restarts after two hours, when the blood glucose levels have risen. These topics, and the evidence-based application of this technology are covered in crisp and simple-to-understand language for the clinician, though the use of more practical examples and case studies may have helped.

The next few chapters focus on the inpatient and outpatient studies with the artificial pancreas. The fundamental considerations in such technology are also explained. This section is discussed along with photographs of subjects enrolled in these studies. These pictures bring a human perspective to the technological advances. Another chapter on continuous intraperitoneal insulin infusion with an implantable pump highlights scientific aspects of this technology.

Today, technology in diabetes management is not just about insulin pumps and high-tech monitors. Simple and complex mobile applications, decision support systems for bolus insulin adjustments have all revolutionized the treatment. In fact, such treatment, has allowed even remote monitoring of glucose levels by caregivers situated far away from the patient. One chapter appropriately lists the use and problems in the scalability of mobile technologies and applications in remote management of diabetes, and also includes a discussion on telemedicine. A detailed discussion on a mobile phone-based telemedicine system is also included. The book ends with a chapter that focuses on aspects of diabetes care that can be improved

by technology. The implications of technology in improving quality of life, preventing what the authors call 'Diabetes Discomfort', preventing hypoglycaemia, and addressing emotional aspects and patient's distress are all covered in the concluding chapter.

The book has two limitations- firstly, the use of case studies in greater numbers would have enhanced readability and at the same time, it would have lent a clinical perspective to the write up. Secondly, diagrammatic representations, flow charts of algorithms could have been used much more effectively to simplify complex technological aspects of type 1 diabetes management.

However, in spite of these minor limitations, the book is a useful treatise on the management of diabetes for diabetologists/ endocrinologists who manage type 1 diabetes and are looking for new treatment options; academicians and researchers who are looking for fine tuning their knowledge about management of type 1 diabetes, so that they can explore the research applications of this technology; and biomedical innovators trying to develop the next generation technology. This book summarizes the latest technology that is available, so that these innovators can try to conceive and visualize the next, and more futuristic advances in technological management of type 1 diabetes.

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