Book review

**Buttonhole Cannulation: Current Prospects and Challenges**

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Editors: M. Misra, S. Toma & T. Shinzato
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*Buttonhole Cannulation: Current Prospects and Challenges* compiles Volume 186 of *Contributions to Nephrology* papers in a book form. The essence of this book is to raise awareness of the advantages of using buttonhole cannulation and how to manage the challenges in implementing this technique. This book is suitable for all nursing and medical staff who have an understanding and experience of the buttonhole method. The authors of the scientific papers presented in this book are mainly from Japan, with most studies being single-centred observational design and consisting of small sample sizes.

The first paper, “History of the Buttonhole Technique” was comprehensively written by Misra (pp. 1–12) who provides a detailed trace of how Dr Twardowski unexpectedly discovered the constant-site puncture method in 1972. George Krönung's involvement in renaming this method as the “buttonhole puncture technique” in 1984 was also included. This paper has several relevant photos and diagrams relating to the buttonhole method. It was pleasant to see Lynda Ball's publications and contribution to the buttonhole method acknowledged in this paper.

A global revival of the buttonhole method occurred in the 2000s as publications highlighted the benefits of reducing cannulation pain and ease of cannulation, although Ogawa et al.'s paper, titled “Impact of Buttonhole Cannulation on Patients and Staff in Hemodialysis Facilities” indicates the percentage of patients using this method has reduced (pp. 13–20). This paper briefly reviews the impact this method has on patients and staff in haemodialysis facilities and suggests how to overcome some challenges involved for successful implementation.

Jennie King’s paper, “Buttonhole Tunnel Tract Creation with the BioHole Buttonhole Device” explains the effect this device has on expediting the development of the buttonhole track (pp. 21–32). This paper describes how the BioHole BH device (peg) is utilised in a descriptive manner, outlining the advantages and disadvantages of its use. Several relevant photos of the peg application are included in this paper. This paper focuses on promoting the use of the peg to overcome staffing issues involved in utilising the buttonhole method, such as having multiple cannulators to establish the buttonhole track.

Miwa et al.’s paper, “Causes and Solutions of the Trampoline Effect” clearly explains the reasons behind this frequent barrier to the buttonhole method (pp. 33–40). This paper describes a small, single-centred observational study using a needle, which is yet to be widely manufactured, as a means to provide some solution to overcome the trampoline effect.

A novel method of scab removal was described by Shinzato et al. in their paper, “A New Method That Enables Complete Removal of Scabs at Buttonhole Entry Sites” (pp. 41–47). In an attempt to overcome the time involved in scab removal at the buttonhole entry site, this paper describes a new procedure to remove the scab without causing damage to the skin. This study had a small sample size and the histological examination was only based on two patients who gave informed consent. Further larger studies would be required to ensure this procedure overcomes the difficulty involved with scab removal.

Buttonhole cannulation is associated with a greater risk of infection compared to the rope-ladder technique (Lok et al., 2013). Sato et al.’s paper “Deformity of Buttonhole Entry Site Causes Higher Frequency of Vascular Access-Related Infection” (pp. 48–56) is a larger study, which clearly describes the different appearances of the buttonhole entry sites and the incidence of access-related infection. This paper had a greater use of statistical analysis than previous articles in this book. They found a bulging buttonhole entry site was >5 times

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more at risk of access-related infection compared to a flat site (Sato et al., 2015). Reasons for the incidence of infection and recommendations were briefly presented.

Toma’s paper, “Relationships between Years Elapsed after Initial Buttonhole Cannulation and Frequency of Vascular Access-Related Infections” also suggests buttonhole infection is factored by the “deformity of the buttonhole entry site”, rather than the actual buttonhole tunnel track or the number of times the dull needle is inserted (pp. 57–63). This study again was observational and provided a weak conclusion. Some insight into the difference in cannulation technique between Japan and other parts of the world was highlighted.

Recent clinical practice recommendations were summarised in Agarwal and Nesrallah’s paper, “Long-term Safety of Buttonhole Cannulation and Efficacy of Mupirocin Prophylaxis” (pp. 64–70). They presented the incidence of infection concisely. The authors conducted an unbiased review of the Canadian Society of Nephrology (CSN) practice guidelines, the CSN Intensive Hemodialysis Guideline and Kidney Dialysis Outcomes Quality Initiative (KDOQI) Vascular Access guidelines, which highlighted the literature on buttonhole technique as being conditional and based on low-quality observational design studies with methodological limitations. The authors described the necessity of innovative research designs to overcome the logistical difficulty in conducting robust randomised trials comparing cannulations methods.

The use of buttonhole method was described in the paper by Hayakawa et al. “Application of Buttonhole Cannulation Technique to Surgically Superficialized Arteries” (pp. 71–78). This paper had several illustrative diagrams and photographs of the surgical procedure required for this uncommon vascular access. This paper details how the buttonhole method can be implemented in patients with limited vascular access and poor cardiac function.

Overall, this book promotes the buttonhole method through a series of short papers, mainly based in Japan. I found the content repetitive due to the separate paper format, but topics were relevant to the total buttonhole experience. The editors do acknowledge and state the need for further robust research in order to overcome barriers related to the buttonhole method.
The Contributions to Nephrology series provides current information for doctors and nurses working in the various subspecialties of nephrology. The series Chief Editor is Professor Ronco, a well-recognised, reputed author, researcher and international speaker in various aspects of nephrology including acute kidney injury (AKI). Professor Ding is a nephrologist who hails from Shanghai Medical College (Fudan University) and Zhongshan Hospital (Division Nephrology). As co-editors for this volume on AKI, they have attracted a collection of well-known experts from around the world to create a succinct yet complete review of the current most controversial aspects of AKI. Notably the authors originate from Asia, Europe, the USA and Canada.

AKI remains a serious disorder with high morbidity and mortality. Increasing efforts have been directed towards means to reduce this statistic, by earlier identification of risk and intervention therapies that marry for best patient outcomes. But many debates persist, especially related to initiation of therapy, therapy modality and dose, and when to cease therapy.

The ADQI (Acute Dialysis Quality Initiative) group, formed around 2000, assisted in research direction and garnering a focus for investing to enable more evidence-based practice. In more recent times, the KDIGO AKI guidelines and AKIN (Acute Kidney Injury Network) support further research and development of clinical practice guidelines (CPG) to support clinicians in attaining better outcomes. This book brings together some of these luminaries who have been instrumental in initiating the refocus on AKI and informing practice.

The book, a compilation of 12 well-referenced papers is organised into three broad categories that address the incidence, identification and management approaches to AKI: AKI characteristics and epidemiology; AKI pathophysiology and diagnosis; and AKI management. This concise resource has been developed to support clinical decision making for doctors and nurses working in the area of AKI management, both in nephrology and ICU units.

I. AKI characteristics and epidemiology

This section comprises three papers addressing epidemiology, AKI definition, prevention, renal recovery and patient outcomes. The papers provide useful analysis of current literature, guidelines and available registry data with summaries of the salient points to guide research and practice.

II. AKI pathophysiology and diagnosis

After setting the scene, the next section of four papers presents analysis of the latest in biomarkers, balancing use of novel therapies with prevention of fluid imbalance and identifying the risk characteristics of AKI to chronic kidney disease (CKD). An interesting paper explores the future use of electronic health records (EHR) using algorithms to identify early those at risk, with the potential to either moderate or prevent AKI. This alert system, however, needs more evidence to support the development of sensitive decision-making algorithms with linkage to CPG (KDIGO).

III. AKI management

There remains much debate about when to start AKI therapy, what therapy to use and the target dose, so the final section embraces this by analysing the available research and CPGs, alerting the reader to findings of ongoing research and future clinical targets for AKI. At the end of this section there is a paper outlining the particular issues related to paediatric continuous renal replacement therapy and another discussing AKI related to cardiac surgery.

In summary, this book is a useful resource of not only the latest information, but analysis that helps to demystify the plethora of data by organising the evidence for the clinical team to guide their practice. However, nurses reading this text may seek further information related to specific nursing care and procedures for AKI. Nonetheless, this book provides the framework for organising the information.

A useful reference resource for those working in the acute care setting managing the myriad of conditions leading to AKI, authored by many of the leading researchers and authors on AKI management globally.
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