

Percutaneous Renal Surgery

A Practical
Clinical Handbook

David R Webb

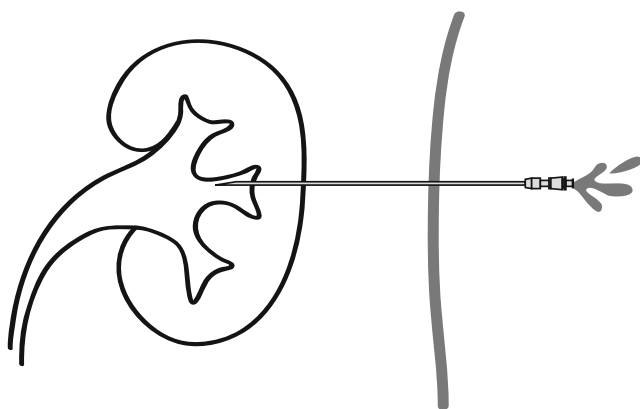
 Springer

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A Practical Clinical Handbook



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Preface

It is more than 30 years since the first elective endoscopic percutaneous removal of a calculus, initially via an operatively created nephrostomy and later via a radiologically established nephrostomy track (Alken et al. 1981).

Within 12 months this technique was embraced throughout Europe, America and Australia (Wickham and Kellett 1981).

I was fortunate to be the assistant at the first Australian percutaneous nephrolithotomy (PCNL) at the Royal Melbourne Hospital in 1982.

Extracorporeal shockwave lithotripsy (ESWL) was first performed in West Germany in 1980 by Professor Christian Chaussey (Chaussey et al. 1980).

Early ESWL required expensive technology and bulky equipment. As a result, ESWL was unavailable outside West Germany until John Wickham established the London Stone Centre in 1984 (Wickham et al. 1985).

In 1993 I had the privilege to work as senior urological registrar for the late Professor John Fitzpatrick, who introduced PCNL to Ireland, at the Meath Hospital, Dublin.

Under his supervision I studied the effects of PCNL on the canine kidney at Trinity College, Dublin, for my master of surgery thesis (Webb 1985).

Using these models, we demonstrated that a large nephrostomy could be created safely and established the anatomical basis for safe percutaneous access to the kidney (Webb and Fitzpatrick 1985).

These studies were confined to the kidney, its vasculature and the collecting system. They did not include the body wall.

Percutaneous radiological puncture of the kidney was routine for German trained urologists because they performed their own imaging.

However, most urologists outside Germany were not familiar with renal imaging, so a partnership was required between an interventional radiologist and urologist to create the nephrocuteaneous access track.

Urologist–radiologist teams sprouted like mushrooms worldwide: Wickham and Kellett (UK), Fitzpatrick and Hurley (Ireland), Marberger and Hruby (Austria), Nunn and Hare (Melbourne), Segura and Castaneda (USA), etc. These partnerships developed the “two-stage percutaneous nephrolithotomy”.

The first stage, the nephrostomy, was performed by the radiologist in the X-ray department on an awake patient.

The second, or endoscopic stage, was performed in the operating suite under general anaesthetic by the urologist, often many days after the nephrostomy.

This cumbersome, yet revolutionary, leap forward in removing renal calculi, was immediately successful for the removal of small renal stones.

It soon became apparent that these small stones were also the most suitable for contact-free ESWL. Experience quickly demonstrated that for the totally minimally invasive removal of all renal calculi, skills in both ESWL and PCNL were required (Webb et al. 1991).

Calculi most suitable for PCNL were hard, branched and infected stones associated with complex renal anatomy and compromised drainage.

Therefore, for these complex stones, the “two-stage” technique that utilised a single radiological track was inadequate to completely clear branched calculi.

This reality made it obvious that urologists practising PCNL for complex calculi had to be able to create their own separate nephrostomies at the time of surgery to achieve complete stone clearance.

The century-old skills of endoscopy were familiar to all urologists, but ultrasound and image intensifier (II) screening, and percutaneous renal puncture, were foreign concepts.

Urologists were not initially comfortable with a procedure they could not see!

In his keynote address to the Third World Congress of Percutaneous Surgery and ESWL (1985 New York), Professor Peter Alken summarised safe percutaneous access as “the shortest straight track entering the tip of a calyx”. This “percutaneous epiphany” embodied our research and recommendations for safe intrarenal access. Alken’s paradigm also included the track from the skin to the kidney.

In 30 years of practising and teaching percutaneous renal surgery (PCRS), it has been my experience that the major difficulty urologists experience with PCNL is that of percutaneous access.

There are no texts dedicated solely to renal access. Most descriptions are contained in large general endourological tomes. They tend to be confined to straight-forward cases, rather than complex scenarios and options when an approach fails.

This manual aims to provide a simple “cookbook” for PCNL. It describes techniques for percutaneous renal access, attempting to demystify, explain and provide surgical plans to treat simple and complex calculi.

As a practical clinical handbook, this text is not an encyclopaedic reference book. Hence, instead of heavily referencing each chapter, I have provided a reading list at the end of the book. It combines 30 years of practice, teaching, research, international meetings and feedback from my colleagues and students and support from the University of Melbourne and especially Austin Health Melbourne. I was extremely fortunate to be in Europe during the embryonic years of PCNL and acknowledge the influences of John Wickham, John Fitzpatrick, Ron Miller,

Mike Kellett, Peter Alken and Michael Marberger and from the other side of the Atlantic, Joe Segura, Ralph Clayman, Arthur Smith, James Lingeman and countless others.

I could not have put my experiences on paper without the Austin Hospital supporting my sabbatical leave and the help of their theatre staff.

In this manual I generally describe my own technique, using a “single-stage dilator” (SSD), which has evolved over 30 years from our original and adapted concepts and experience and SSD access to the kidney was pioneered in Melbourne both clinically and in the laboratory.

The safety and development of this dilator was undertaken in 1991 in Melbourne as a prelude to the adaption of adult percutaneous renal surgery to infants and toddlers at the Royal Children’s Hospital (Travis et al. 1991).

I use this dilator for every percutaneous renal operation but freely acknowledge that, as with all surgeons, each has their own favourite instrument and technique.

I do not claim the single-stage dilator to be superior to other methods of renal access. It is the instrument and technique that works best for me.

The concepts and methods described in this manual are equally transferable to the other commonly used systems including the serial Amplatz, balloon, telescoping metal dilators and the new single-stage dilators used with the miniature nephroscope system, commonly known as “mini perc”.

This book does not attempt to be a textbook of endourology, but rather a series of simple algorithms for obtaining safe intrarenal access and stone clearance.

This manual is dedicated to my mentors, teachers and students, in particular Professor John Fitzpatrick, Mr John Wickham, Dr Michael Kellett and Professor Bill Hare and my Melbourne colleagues, Dr Trung Pham, Professor Damien Bolton, my fellow Austin Hospital urologists and theatre staff and, in particular, Professor Nathan Lawrentschuk who has never given up encouraging me to document my experience with PCRS.

This publication would not have been possible without the enormous advice and support of my co-author, Dr Olivia Herdman; proof readers, Drs Frank Darcy and Rustom Mahecksha; and the magnificent illustrations by Jeffrey Gunadi BA. I owe them all my most profound gratitude.

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Suggested further reading

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Retrograde intrarenal surgery (RIRS) performed using a flexible ureterorenoscope marked the beginning of a new era in urology. Today, even staghorn stones are successfully treated via RIRS.Â Retrograde Intrarenal Surgery versus Percutaneous Lithotripsy to Treat Renal Stones 2-3 cm in Diameter. Kursad Zengin,¹ Serhat Tanik,¹ Nihat Karakoyunlu,² Nevzat Can Sener,³ Sebahattin Albayrak,¹ Can Tuygun,² Hasan Bakirtas,¹ M. Abdurrahim Imamoglu,¹ and Mesut Gurdal¹.