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Introduction

Over the past few decades there has been a global shift toward ambulatory surgical care across different specialties.^{1,2} Patient safety—specifically reducing the incidence of nosocomial infections—and cost containment have been significant drivers of this shift.³ Among surgical specialties, Urology has been one of the leaders in advancing ambulatory surgical care. Presently, most penoscrotal and endoscopic urologic operations are routinely performed in an ambulatory setting.⁴

Despite Preminger's initial case series on ambulatory percutaneous nephrolithotomy (aPCNL) from the 1980's,⁵ patients undergoing PCNL have traditionally been admitted postoperatively. Recently, Canada has been pioneering the shift to aPCNL, with Queen's and McGill universities having reported independent small case series,^{6,7} as well as a multi-institutional study⁸ that showed this approach to be safe and effective in 50 highly selected patients, with an acceptable readmission rate of 4%. Additionally, Abbott and colleagues reported their aPCNL experience in over 60 patients.⁹ There is now an opportunity to offer aPCNL to select patients who meet previously published strict criteria.^{6,7} Admittedly and rightfully many urologists, including some endourology thought leaders, believe aPCNL may be unwise and potentially unsafe due to valid concerns about the potential for post-PCNL hemorrhage. Despite these concerns, based on recent presentations and publications, there is an appetite for expansion of aPCNL to other centres of excellence. The purpose of this article is to—through the CanMEDS 2015 Physician Competency Framework¹⁰—offer tips and lessons learned from our experience to those interested in starting up an aPCNL program.

Lesson #1: Strive for a perfect puncture – CanMEDS Medical Expert Role

It is wise to start an aPCNL program in a stepwise fashion. A perfect puncture is the crucial technical step of PCNL that allows urologists to send patients home mere hours following surgery. We recommend aiming for percutaneous access via a calyceal tip – every time, with no exceptions. To strive for perfection every time, we use the “bull's eye” or “eye of the needle” technique.¹¹ There are two easy questions to ask to determine if one's access technique is perfect. First, upon initial insertion of the rigid nephroscope, is there bleeding or blood clots that impair visualization? Second, is performing flexible nephroscopy difficult or even impossible due to suboptimal visualization from bleeding? If the answer to both questions is “no,” then your technique is not perfect enough to consider same day discharge following PCNL. To optimize puncture technique, some may prefer to practice on simulators. Others may prefer to obtain the access under ureteroscopic or ultrasound-guidance. No matter which access technique is chosen, it is important to strive for a perfect puncture at the calyceal tip.

Lesson #2: Try tubeless – CanMEDS Leader Role

After the renal access technique has been optimized, the next important step is to avoid nephrostomy tubes and adopt a tubeless approach to PCNL in select cases. After all, most urologists will ultimately need or use the nephrostomy tube for a second-look nephroscopy in the minority of patients. We therefore suggest performing tubeless PCNL and admitting the first several cases to appreciate how rare it is that you actually need the nephrostomy tube and perhaps more importantly, to appreciate the rarity of major postoperative hemorrhage. One is then more confident and prepared to proceed with the initiation of aPCNL cases.

Lesson #3: Maintain your usual care – CanMEDS Medical Expert Role

Shifting to aPCNL from conventional PCNL is enough of a change and challenge; additional changes are not necessary. The new approach of aPCNL will take almost any urologist out of their comfort zone, so as much as possible we recommend treating aPCNL patients the same as any other PCNL patient. Specifically, maintaining one's usual follow-up protocol and avoiding the changing of too many variables all at once will provide some peace of mind when starting aPCNL.

Lesson #4: Select proper patients – CanMEDS Health Advocate Role

Perhaps no lesson is more important than strict patient selection. This starts in the preoperative clinic with an assessment of the patient's comorbidities and finishes in the recovery room with an assessment of the patient's clinical status and early postoperative test results. One should be very strict and highly selective when starting. All early patients should readily meet the original strict criteria as published in the two case series.^{6,7} Patient safety must be a priority so if even one criterion is not met, the patient should be admitted to hospital. Do not hesitate to change your mind intra-operatively or postoperatively—follow your “gut-feeling” and admit the patient if not sure. The criteria can be loosened as experience and comfort are gained from observing how well these highly selected patients do after an aPCNL.

Lesson #5: Prepare patient and family – CanMEDS Communicator Role

Managing patient and family expectations is paramount. During the preoperative consultation, it is important to prepare the patient and family for possible same day discharge. If this is not done, the default position—a postoperative admission to hospital—will be expected. We routinely prepare patients by telling them there is a decent chance they will be well enough for same day discharge but to bring an overnight bag in case they need to be admitted postoperatively. Also, specifically establish who will drive the patient home and stay overnight with them at home post-PCNL if they are discharged the same day.

Lesson #6: Engage nursing team – CanMEDS Collaborator and Professional Roles

To safely and efficiently get patients home 3 to 4 hours after PCNL, involve nurses in the process and decision-making.

Recovery room nurses are particularly efficient at recovering patients after surgery and have great insight into who is fit for discharge. By showing the recovery room nurse that his/her expert opinion is valued, he/she will in turn do their best to optimize the patient's care to get them home safely and efficiently when possible.

Lesson #7: Engage anesthesia team – CanMEDS Collaborator and Professional Roles

It is equally important to involve the anesthesiologist in the decision-making process when anticipating potential candidates for aPCNL. This starts preoperatively with asking (not telling) the anesthesiologist what they think of possible same day discharge for the particular patient. That way, the anesthetic agents delivered can be planned in such a way that allow early discharge if the patient qualifies for aPCNL in the recovery room. In addition, the wound could be infiltrated with local anesthetics and the patient could be given acetaminophen suppositories prior to awakening from anesthesia. For obvious reasons, the anesthesiologist's assessment in the recovery room is a key component in deciding the patient's suitability for same day discharge.

Lesson #8: Contact patients in the early postoperative period – CanMEDS Communicator and Health Advocate Roles

Given that the standard management of penetrating renal trauma involves admitting patients for bed rest, it is no wonder that urologists would naturally be uncomfortable sending patients home immediately following PCNL. Whether or not it is one's usual practice, we recommend urologists check in with their aPCNL patients by phone the evening of surgery. From the patient's point of view, the phone call is a pleasant surprise because it is often unexpected, and from the urologist's perspective knowing the patient is doing well and not bleeding significantly helps the urologist sleep at night, especially for the first few aPCNL patients.

Lesson #9: Re-evaluate your program on a regular basis – CanMEDS Scholar Role

Be critical with yourself and this new approach. Evaluate your results and compare with your standard PCNL results. Be willing to modify criteria as you gain experience and become more comfortable with aPCNL. Knowing limits and when to push them slowly and safely are critical in reducing the risk of harming aPCNL patients.

Lesson #10: Be available when patients call or return to the emergency room – CanMEDS Health Advocate Role

No matter how much preoperative and intra-operative meticulous care is provided, patients invariably have questions or concerns during their postoperative course. It is important that aPCNL patients are provided with clear instructions on why, when and where to return (for example, significant hematuria with clots or fever greater than 38.5°C). In addition, they need to be provided with a telephone number where they can reach a physician 24 hours/day during the early postoperative period. Furthermore, a member of the urology team should be available to evaluate aPCNL patients when they return to the emergency room (ER). In our combined series of 50 aPCNL patients, 12% returned to the ER and 4% were readmitted with Clavien Grade I-II complications. There were no Grade III-V complications.⁸

Conclusions

As urologists know from the conservative management of renal trauma cases, the kidney possesses an innate ability to heal itself following trauma. Specifically with respect to PCNL, the collecting system normally seals uneventfully; perhaps a lot quicker than most of us realize. We consider the proper technique of percutaneous puncture at tip of calyx to be “controlled renal trauma.” With this approach, it is expected that the kidney will heal with minimal hemorrhage and urinary extravasation. Despite this, many urologists will understandably be concerned about discharging patients 3 to 4 hours after PCNL, in part due to their concern of early postoperative hemorrhage. From our experience, any significant intraoperative or early postoperative bleed will be evident while patient is in the operating room or recovery room, prior to when patients are typically discharged for aPCNL. In addition, aPCNL is not appealing for urologists who routinely perform second-look nephroscopy. However, patients could be managed in an ambulatory fashion after their second-look nephroscopy.

This article provides urologists interested in aPCNL a CanMEDS perspective of lessons learned from our experi-

ence with aPCNL to date. Because of the strict inclusion criteria, our experience to date is based on a small combined experience of 70 patients to date, the first 50 of which were reported in our initial multi-institutional publication.⁸ However, we are constantly re-evaluating our results and expanding the inclusion criteria as we gain more experience. We are confident that these lessons can be used as a guide to help other urologists who are interested in performing aPCNL. We invite any urologists to contact us if interested in collaborating with us on future multicentered aPCNL clinical trials.

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