Percutaneous Nephrostomy Placement in Neonates: Not Simply “Miniature Adults”

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Received: 15 June 2020 / Accepted: 4 July 2020 / Published online: 16 July 2020

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While percutaneous nephrostomy (PCN) placement is a basic staple of interventional radiology practice, very few interventional radiologists place PCNs in infants and neonates. The paper by Kljucsek et al. [1], which appears in this issue of CVIR, addresses this important topic.

Whereas there are several published papers that deal with PCN and interventional urology in children [2–5], Kljucsek et al. detail their experience with PCNs placed in the youngest subset of children, neonates, generally defined as infants 1 month of age and less, and the unique difficulties they encountered. Expedient urinary decompression in neonates with obstructive uropathy or pyelonephrosis is essential to preserve kidney function. Often, these patients have congenital anomalies that require complex surgery for repair or reconstruction; however, the neonatal period is not the optimum time for this. PCN can serve as a bridge, maintaining urinary output and protecting nephrons, while the child grows, gains weight, and becomes a more suitable surgical candidate.

Although PCN placement in adults and some older children can usually be performed with IV anxiolytic sedation and local anesthesia, young children and neonates need deeper sedation or general anesthesia. Kljucsek et al. performed their PCNs under general anesthesia (GA). Whether to employ general anesthesia or deeper IV sedation is a matter of team preference, though general anesthesia is often preferred by anesthesiologists since the infants are prone, and GA insures control over infant's

respiration and hemodynamics. Regardless of what type of sedation/anesthesia is used, or who administers it, it must be supervised by someone competent in resuscitating infants, and the procedure suite must be properly equipped for this.

Neonatal kidneys are small. Despite their relative proximity to the skin, the relative lack of subcutaneous and retroperitoneal fat make them more mobile and liable to retract from the advancing access needle. Normally, a distended hydronephrotic kidney affords a more favorable target for entry due to the increased tension. However, the neonatal renal parenchyma tends to be more pliable than that in older children and adults, increasing the risk of the parenchyma “puckering” away from advancing dilators and catheters. The unfortunate result can be the PCN pigtail ending up in an extrarenal position, despite an initially successful access to the hydronephrotic collecting system with needle and guidewire [1, 4]. Skill with catheter-guidewire manipulations, decisiveness when performing coaxial dilations, and insuring intraluminal positioning of catheters prior to relinquishing guidewire access, are essential to preventing this. In addition, neonates' size mandates the use of the smallest caliber drainage catheters, such as the 6.3F pigtails used by Kljucsek et al. By virtue of their fragile, gracile nature, these drains are much more vulnerable to dislodgement and breakage than the larger caliber drains that can be used in older children and adults. Neonatal patients therefore need careful follow-up after PCN placement.

Image guidance strategies must insure the least possible exposure to ionizing radiation. Ultrasound (US) should be used, as much as possible, for guidance. High quality ultrasound equipment is needed. Sometimes, it is possible to perform PCN using US alone [5]. However, in most

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circumstances, the procedure will necessitate a hybrid imaging approach, with US guided access to the collecting system, then fluoroscopy-guided coaxial dilation and PCN pigtail placement over the guidewire. One should strive for the least amount of live fluoroscopy time and use of pulsed fluoro at slowest frame rate tolerable. Fluoro-save or stored “last image hold” should be used for image documentation, rather than dedicated radiographic exposures, when possible [6]

In short, PCN placement in neonates presents some challenges not typically encountered with adult patients, however, in experienced hands, has a high technical success rate and clinical value, with acceptably low complication rates.

Funding This study was not supported by any funding.

Compliance with Ethical Standards

Conflict of interest The author declares that there is no conflict of interest.

Ethical Approval This article does not contain any studies with human participants or animals performed by the author.

Informed Consent For this type of study, informed consent is not required.

Consent for Publication For this type of study, consent for publication is not required.

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