A novel equipment for measuring the urine output in paediatric patients

Sir,

Paediatric patients undergoing surgery necessitate intravenous (IV) fluid administration to compensate perioperative deficits, third-space losses and haemorrhage.\(^1\) One of the necessary components of perioperative monitoring for paediatric surgery of prolonged duration is hourly urine output measurement. Urine measurement via urinary catheter can be used as an indirect marker of renal, cardiovascular and fluid status of the patient.\(^2\) Feeding tubes are commonly used to catheterise the bladder in infants, neonates and young children since they are cheap and widely available in multiple small sizes.

Usually, the urinary catheter is connected to 100–200 cm long polyvinyl chloride (PVC) tube which is attached to calibrated urobag of 1 L capacity through calibrated uromoter of 100 ml capacity.\(^3\) Since the dead space of PVC tube is more owing to its long
length and diameter, it is difficult to measure urine output accurately as urine is commonly found to be accumulated in PVC tube. To overcome this problem, it requires frequent milking of PVC tube to facilitate the collection of urine in bag. Furthermore, the weight of the urobag can cause traumatic pull at the catheter leading to acute urethral injury.

Numerous calibrated urine-collecting bags with urometer are commercially available in the market but are expensive and not available at all places. Hence, we made new simple equipment for measuring urine output in paediatric patients, especially infants and newborns.

To make this equipment, we used one infant feeding tube (La-med Healthcare Pvt. Ltd, India), one IV infusion set (Romsons Juniors India), one three-way stopcock (La-med Healthcare Pvt. Ltd, India) and one 23G needle [Figure 1a]. Long tubing of IV infusion set can be cut to half or 3/4 length to reduce dead space and unnecessary dragging. The proximal end of the infant feeding tube is connected to the distal end of the IV infusion set. The proximal end of IV infusion set after removal of the sharp piercing spike is connected to a 50 ml syringe after retraction of the plunger through a Polymed three-way stopcock. Urine flows down from the urinary catheter into the IV infusion tube and gets collected in the syringe. A 23G needle is pierced to the syringe so that when urine enters inside, the syringe air will go out through the needle [Figure 1b]. A stopper is applied to the needle hub and partially closed so that urine cannot spill from the syringe as well as air can go outside. All connections are tightly fit which can prevent leaks. This will maintain sterility.

When syringe becomes full of urine, three-way stopcock is closed, needle hub is closed with a stopper, syringe is disconnected from three-way stopcock and then urine can be disposed.

Since there are 1 ml markings on the syringe, this equipment has the potential for very accurate measurement of small amount of urine. Other advantages are that it is simple to make, cost-effective and the dead space of IV infusion set tube is very less.

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Shipra Tandon, Ashutosh Kaushal, Priyanka Gupta, Rudrashish Haldar

Department of Anaesthesia, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, "Department of Anaesthesia, SGPGIMS, Lucknow, Uttar Pradesh, India

Address for correspondence:
Dr. Ashutosh Kaushal,
Department of Anaesthesia, All India Institute of Medical Sciences, Rishikesh - 249 201, Uttarakhand, India.
E-mail: drashutosh.kaushal@gmail.com

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Intraoperative haematuria during lumbar spine surgery in prone position: A diagnostic dilemma

Sir,

Haematuria may be a sign of an underlying disorder such as malignancy, calculi or infection. It is also a manifestation of inappropriate transfusion, urethral rupture or azotemia. Intraoperative haematuria especially in prone position is a very difficult situation for an anaesthesiologist to evaluate and manage due to unavailability of sufficient tools for assessment of the origin of haematuria in the operating room. It may also add to the surgical blood losses and contribute to morbidity and mortality. After obtaining patient consent, we report a case of intra-operative haematuria in a patient undergoing lumbar spine surgery in the prone position.

A 35-year-old female, suffered a fall from the fourth floor of an under-construction building with impact on her feet. Her previous medical and surgical history was unremarkable. Extended focused assessment with sonography in trauma (e-FAST) at the time of admission was negative. Baseline routine investigations including coagulation profile were normal. Computed tomography (CT) of spine revealed burst fracture of L1 vertebra. Patient was paraplegic with urinary catheter in situ for bowel and bladder incontinence. On the fourth day of admission, she was posted for trans-foraminal fixation of L1 vertebral fracture. After administering general anaesthesia, she was positioned prone and surgery was started. Following 30 min of commencement of surgery, frank hematuria was noted, which accounted for ~400 ml fresh blood in the urinary bag and tubing. Bolus of ringer lactate (500 ml) was rushed intravenously. Surgery was stopped and urinary catheter was flushed with 250 ml of normal saline after taking urology opinion telephonically. Following the flushing, frank haematuria reduced, however blood tinged urine continued to drain throughout the surgery. As haemodynamic parameters were stable, surgery was resumed. Haemodynamic parameters remained stable throughout the intraoperative period. As patient's haemoglobin remained ~11 gm/dl, no blood transfusion was done intra-operatively. In the immediate postoperative period, an ultrasound abdomen done by the bedside reported thickening of the posterior wall of urinary bladder with mild free fluid in the pelvis. Computed Tomography (CT) urogram was also done, which revealed retroperitoneal haematoma extending up to the right psoas muscle and a right peri-renal haematoma with renal contusion [Grade II injury according to American Association for the Surgery of Trauma (AAST)] Figure 1a-c with clots in the urinary bladder. The patient was managed conservatively. Visible haematuria stopped on second postoperative day. Further post-operative course remained uneventful and patient was discharged on eight day. Patient was followed telephonically; currently she is able to walk without support for 2 months after the discharge. However, she still has bowel-bladder involvement, she has to strain while voiding urine and passing stool.

Prevalence of renal trauma among trauma patients ranges from 0.3% to 3.25%. Fall from height is the second most common trauma associated with blunt renal injury after the motor vehicle accident. e-FAST is less sensitive to diagnose and define renal injury.