

Calibrated polyvinyl chloride tube of urine bag in urine output measurement of neonates

Sir,

Peri-operative urine output monitoring constitutes one of the essential components of monitoring in surgeries of prolonged duration or those involving fluid shifts. Urinary bladder catheterisation is the only reliable method of monitoring urine output. It is usually monitored visually by hourly assessment of urine collected in a calibrated urine bag. Hourly urine output can be used as an indirect marker of renal, cardiovascular and fluid status of the patient. Hourly urine output varies from 0.5 to 1 ml/kg/h in adults to 2 ml/kg/h in neonates and infants.[1]

Various calibrated urine collecting bags are commercially available. They essentially consist of a calibrated urine chamber (capacity 100 ml in paediatric and 250 ml in adult variant) which drains into a urine bag of capacity varying from 1 to 2 L. The urine chamber is connected to 100–200 cm long kink resistant polyvinyl chloride (PVC) tube which is connected to the Foley catheter.

Hourly urine output measurement is accurate and requires less milking of PVC tube in adults because of sheer larger hourly urine volume. However, when it comes to neonates, smaller hourly urine volume coupled with long PVC tube requires frequent milking to facilitate the collection of urine in bag which would otherwise be commonly found accumulated in PVC tube. This might affect the accuracy of urine output measurement.

We have devised a method of calibrating PVC tubes of urine bags and their subsequent use in urine output measurement in neonates. We calibrated PVC tube of urine bags available in our hospital supply by cutting a length of PVC tube (10 cm) and filling it with normal saline by occluding its one end. On dividing the volume required to fill the entire cut length by the cut length, we were able to ascertain the volume occupied per centimetre of PVC tube [Figure 1a].

Subsequent to calibration of PVC tube (volume occupied per centimetre of PVC tube), this knowledge can be used for enhancing the accuracy of urine output monitoring in neonates. A loop of PVC tube is made, marked and secured to the operating table using an adhesive tape close to Foley catheter [Figure 1b].

The PVC tube of adult urine bag available at our centre (URO METER® Romsons®, India) accommodates 1 ml of liquid per 3.5 cm.[2] The volume of urine accumulated in the loop every hour can be ascertained by either marking the loop every 1 or 3.5 cm or using a

![Figure 1: (a) Calibration of polyvinyl chloride tube. (b) Loop marked every 3.5 cm](image)
measuring tape to measure the length of loop occupied by urine. We prefer marking the loop every 3.5 cm.

This simple innovation could result in improving the accuracy of urine output monitoring in neonates.

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Conflicts of interest
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Riaz Rameez, Shamim Rafat, Priya Vansh, Singh Prabhat Kumar
Department of Anaesthesia, SGPGIMS, Lucknow, Uttar Pradesh, India

Address for correspondence:
Dr. Priya Vansh,
3/279, Vishwankhand, Gomti Nagar, Lucknow - 226 010,
Uttar Pradesh, India.
E-mail: vanshkhr@gmail.com

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