# Urinary bladder phantom for ultrasound: feasibility, reliability and effectiveness in nurse training

Dott. ANDREA STELLA (1), Dott.ssa SILVIA MONGODI (1), Dott. LOMBARDI FILIPPO (1), Dott. ALBERTO DORATI (1), Dott.ssa SABINA GULINO (1), Dott. LUCA CANEVA (1), Dott. ERMINIO SANTANGELO (2), Prof.ssa ROSANNA VASCHETTO (2), Dott. ATTILIO QUAINI (1), Dott.ssa GIUSEPPINA GRUGNETTI (1), Dott.ssa ANNA MARIA MASSARA (1), Dott.ssa ANNA MARIA GRUGNETTI (1), Prof. FRANCESCO MOJOLI (1)

(1) Intensive Care Unit, Fondazione IRCCS Policlinico S. Matteo, University of Pavia, Pavia, Italia.
(2) Intensive Care Unit, Ospedale Maggiore della Carità, University of Piemonte Orientale, Novara, Italia.

Argomento: Altro

**Background:** Ultrasound is a useful tool to integrate clinical assessment at the bedside, but requires adequate training. Healthy human model represents the standard for training, but the possibility to create phantoms of pathological findings is paramount. In particular, urinary bladder assessment is frequently performed by nurses, both for the assessment of urinary retention and urinary catheter correct positioning and functioning; these activities can be improved by ultrasound, with adequate training[1,2].

**Aims and objectives**: Our aims were to describe how to create a urinary bladder phantom, allowing measurement of urinary bladder volume and visualization of urinary catheter, in order to integrate ultrasound courses, to assess its reliability for the quantification of bladder volume and to test its image quality and utility in a pilot population of trained nurses.

**Methods:** 5 phantoms with different bladder filling volume were built; a Foley catheter was placed within. We compared measured bladder diameters and computed volume to the actual filling volume to assess phantom reliability in bladder volume estimation. We evaluated the phantom image quality and teaching utility using a 5-points Likert-type questionnaire among a pilot group of nurses having received theoretical and hands-on training with the phantom.

**Results:** All phantoms were easily built with cheap materials. Computed bladder volume had excellent correlation with actual filling volume (p<0.001, $R^2$=0.9874). Survey response rate was 41% (13 nurses); they all judged the ultrasound exploration realistic and considered the phantom useful to help understanding ultrasound images and improve ultrasound skills (Tab.1).

**Conclusions:** An easy to build and cheap bladder phantom helps ultrasound training providing realistic ultrasound image, improving image understanding and skills development and allowing reliable bladder volume estimation.

**References**: 1.Rosseland, Acta Anaesthesiol Scand 2002; 2.Royal College of Radiology. Ultrasoud training recommendations for medical and surgical specialities 2017