

# Standardization of bladder ultrasound: a method to screening bladder urothelioma applied to large scale

## Abstract

Ultrasound is still considered a no standardize diagnostic methodology. Our experimentation has demonstrated that it is possible to employ a simple method for the liver<sup>1</sup> and now also for bladder ultrasound. Basing the ultrasound examination on particular basic and always constant parameters, the sonographer's or the sonographer doctor's actions are made objectified. The standardization needs a minimum of two orthogonal scans that must be shooted for less than a minute on the whole.<sup>2</sup>

The acquired microfilms not only make remote advices (in time and place) possible, but they also represent a valid comparison for longitudinal studies (for example: before and after a potential therapy). Obviously there's some risks for not see any pathology<sup>3</sup> but also without standardization.

**Keywords:** ultrasonographer, ecography standard, remote ultrasonography, potential therapy, longitudinal studies, methodology, ultrasonographic, sonographer, ultrasound, exchangeable, bladder, orthogonally, peribladder, superbladder, standardization

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## Introduction

Ultrasound is a non-invasive methodology of investigation based on the interpretation of the echos reflected by those corporeal structures hit by the ultrasonic beam. At the beginning, the ultrasonographic B-mode image was static. Then, thanks to "real time" devices, it has become a moving image. Today it is possible storing filmed images in electronic form, using them as supporting medical reports documents and consequently as internet exchangeable material for remote advices. It has been possible to demonstrate that a sonographer with appropriate knowledge (ocse method) can produce exhaustive ultrasound films, for the purposes of medical reporting, with a great amount of remote diagnosed pathologies.

## Material and method

Bladder ultrasound examination, according to the technique designed, was carried out with Toshiba APLIO 500 apparatus that is equipped with multifrequency convex ultrasound probe (6C1) with an emission range from 3 to 6MHz.

Bladder ultrasound investigation, was performed only when patient had a sense of bladder fullness. In order to produce the scans, Sonographer, has to follow rules of orientation of the images, in fact in longitudinal scan, the cranial portion of the bladder must project on the left of the observer while in the transversal scan, the right side of the bladder, must project on the left of the observer. In order to obtain the microfilm of the longitudinal scan, it needs move the probe, which is positioned orthogonally on the skin and with the lower edge put on pubis.

The movement of the probe needs to be conducted from the right to the left and vice versa, so as to including the area of peribladder fat and storing the images obtained. The transversal scan, foresees the shifting of the probe bottom-up and vice versa. The scan must be moved high, extends to the superbladder connective cellular tissue, and at the bottom, until the pubis that will cause the classic distal echo shadow.

Every scan, in total, lasts approximately 10seconds, consequently, the standard bladder's scan lasts less than a minute. In our experimentation were considered 143 patients, of whom 83 male patients and 60 female patients aged 45 to 86years. The average age was 65years. The images and microfilms obtained were submitted to 22 radiologist readings with a minimum of two years' of practical experience. Doctors replied to the questionnaire (see questionnaire's table) containing 10 single-choice questions and the last essay question.

## Discussion

Our goal was to identify a unique and standardized method for acquiring ultrasound images of the bladder with microfilm and verifying they could be useful for distance/remote reporting, distance reevaluation and comparison after the therapy. Following this way, and in a very short time, it is possible doing a wide screening on a person in order prevent bladder cancer, for example. When the professionals are exhaustively trained with the OCSE method, (objective structured clinical expertise) very useful for both doctors and paramedics, the results are really satisfying. In this way, in theory, in a working day it is possible screening 300 people, facilitating an early identification of tumor lesions and, consequently, reducing the time and the costs for the neo-plastic pathology treatment. The standardization of the ultrasound imaging gives doctors more opportunities for discussing, with no need of making the patient rehydrate. Actually, without this method, when one wants to discuss about the patient medical case, there are only two possibilities: using very limiting photos or making the patient rehydrate in order to let its bladder full and reevaluate it as a body.

## Results

The greater the readings doctor's experience is, the greater reliability of the diagnostic method will be.

In order to acquire the manual skill required to perform this type of operation, sonographer need at least three months of dedicate training

using OCSE type questionnaire. With this investigation, as well as to highlight bladder disorders, it's also possible to display loco-regional accessory diseases like, for example, ovarian cysts, uterine fibromatosis, sigmoid thickening, ureteric distal stones and prostatic hypertrophy. 100% of readings doctors, considered the bladder ultrasound submitted useful and with a good level of fullness.

In the 90% of doctor's report were identified bladder diverticula. The study shows that, for each individual doctor, it has never been possible to identify 100% bladder malignant disease performed in the microfilms, while all bladder accessory diseases concerning uterine fibromatosis have always been recognized.

Doctors with two years of practical experience have not identified all bladder urothelioma (50%) while doctors with most experienced (>30years of work) have identified 100% all neoplastic lesions and accessory lesion like sigmoid thickening. For this reason it should be considered also the location of the hetero-plastic lesion.

The presence of small bladder urothelioma, located beside the base of male bladder, in a man with a prostatic hypertrophy, can be unknown; in fact in our experimentation just 10 doctors out of 22 have identified a base bladder neoplastic lesion located near the hypertrophic prostate.

## Conclusion

It's not possible draw any conclusions, but the idea of the standardization of bladder ultrasound, carried out by sonographer well

trained, needs short time and let the doctor report in remote mode. We believe that this experimentation could be a very important step not only for bladder lesion's prevention. We hope that other study group use and test this way of exploring bladder in order to achieve results on a large scale.

## Acknowledgements

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## Conflict of interest

Author declares that there is no conflict of interest.

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