What is the future of virtual cystoscopy in urology?

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Replacing invasive diagnostic procedures with non-invasive, sensitive and specific imaging techniques is a growing trend in medicine today. Over 1500 publications can be found using a PubMed search on “virtual colonoscopy,” however, only 87 publications deal with “virtual cystoscopy.” Why are urologists lagging so far behind gastroenterologists?

Virtual colonoscopy (computed tomography [CT], colonoscopy) is increasingly used as a screening method to detect colon cancer. Safer, quicker and less invasive than conventional colonoscopy, this technique uses a 60-second CT scan of the abdomen, along with 3-D reconstructed images, to view the inside of the colon. The CT virtual colonoscopy does not require sedation and can be completed in 15 minutes.

In a *New England Journal of Medicine* publication on asymptomatic adults, CT colonographic screening identified 90% of subjects with adenomas or cancers measuring 10 mm or more in diameter.¹ These findings further supported published data on the role of CT colonography in screening patients with an average risk of colorectal cancer.² Many physicians in the United States thought that the recent accumulation of data showing the effectiveness of virtual colonoscopy as a screening tool for colorectal cancer would be enough to ensure that the procedure would be covered under Medicare. They were wrong. Last year, United States Medicare claimed that, due to an inadequate amount of evidence showing that CT colonography is an appropriate screening test, they would not cover the procedure.³

In recent years, virtual cystoscopy has been evaluated as a potential diagnostic tool in the urological community. However, there are major differences between flexible cystoscopy and colonoscopy. A colonoscopy requires a 6-foot long probe to view the entire colon, carries a small risk of bowel perforation and takes about 30 minutes. In sharp contrast, flexible cystoscopy is performed in a couple of minutes using a thin flexible scope. The procedure is considered somewhat invasive and potentially causes some discomfort, but flexible cystoscopy by no means compares to a

colonoscopy. Side effects of cystoscopy include infection, but they are certainly not life-threatening complications like bowel perforation.

In the present paper published in this issue of the *CUAJ*, the authors evaluated bladder lesions with computed tomographic virtual cystoscopy in 25 patients and they compared these results with conventional cystoscopy and pathological findings.⁴ Virtual cystoscopy detected tumours as small as 2 × 3 mm. Interestingly, out of 38 lesions detected by virtual cystoscopy, 17 were smaller than 1 cm and many of these lesions, especially at the bladder dome, would have been missed with an ultrasound procedure. Cytology was suboptimal, identifying only 3 positive patients. Virtual cystoscopy was feasible in case of bleeding where conventional cystoscopy proved difficult to perform.

The authors admitted that despite their encouraging results, virtual cystoscopy cannot completely replace cystoscopy at the present time. It remains to be seen who will ultimately become the winner: miniature scopes or virtual imaging techniques. These 2 techniques are not necessarily mutually exclusive and it makes sense that in the near future, virtual cystoscopy may play an increasing role as a first-line screening test to evaluate patients at risk for bladder cancer or who present with symptoms like hematuria.

One of the major drawbacks of any radiological technique, as sophisticated and refined as it could become, is that many bladder lesions start as tiny flat lesions more likely to be identified by narrow-band imaging or fluorescence cystoscopy rather than by any imaging technique requiring a minimal tumour volume.

Inescapably though, it is likely that in the next decade, medicine will move more and more towards completely non-invasive diagnostic techniques, including functional imaging rather than invasive procedures even minimally invasive.

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