Several authors have commented on the anatomical changes following radical prostatectomy (RP) for prostate cancer and their characteristic radiological appearances. Most of these relate to periurethral fibrosis and its clinical significance in patients with postprostatectomy sphincter weakness incontinence. On magnetic resonance imaging (MRI), this postsurgical fibrosis appears as a focus of low-signal intensity in the periurethral tissues at and around the level of the vesicourethral anastomosis (VUA) which is appreciable on both T1- and T2-weighted images.

Another finding on MRI and fluoroscopy has become apparent to us in patients post-RP. We describe this radiological appearance as “funneling of the bladder neck,” and to the best of our knowledge, this has not been previously reported in the literature. In this contribution, we characterize this radiological observation and found that on T2-weighted images in the coronal plane, this postsurgical fibrosis giving rise to the contracture. In the presence of funneling of the bladder neck, postoperative urinomas/hematomas would not be limited solely to the anastomotic site, but would tend to extend more cranially to surround part or all of the funneled segments. Therefore, the resulting periurethral scarring and fibrosis would progressively involve a longer segment than that would be expected if funneling did not occur.

In the above-mentioned study, there were three of the 19 cases with BNC, in which funneling of the bladder neck was not apparent on fluoroscopy. Nonetheless, all three of these urethrograms showed extensive contractures (Figure 1e) which were confirmed during surgical revision. In these cases, the entire funnel appears to have become obliterated by the fibrotic process. Consequently, failure to demonstrate radiological funneling is actually an extreme variant of the observation rather than its apparent absence.

Most postprostatectomy BNCs are initially managed endoscopically by dilatation, bladder neck incision, or resection. The extensive nature of some of these contractures resulting from the proximal extension of the fibrosis retrogradely up the funneled bladder neck may explain the high recurrence rate following these minimally invasive approaches such as incision or resection. Surgical revision of the VUA (with excision of all the scar tissues) is the only curative treatment for these patients. Such surgery is often a technically challenging
procedure. Even in the absence of changes due to radiotherapy, the dissection needs to be taken deep into the perineum (Figure 2) to excise the extensively scarred and fibrotic funneled segment that constitutes the BNC until a relatively healthy neobladder neck/bladder base can be defined. Wedge pubectomy is almost always necessary to provide access and exposure, since following prostatectomy, the VUA lies anteriorly in the perineum, almost disappearing under the pubic symphysis.

Contrast studies are the most common imaging modality used in the preoperative evaluation in patients with BNCs. This funneled appearance of the bladder neck makes the identification of individual anatomical landmarks difficult. It also makes it difficult to localize the exact site of a contracture (true anastomotic, anastomotic with involvement of a funneled bladder neck, sphincteric, proximal bulbar, or a combination of these) as demonstrated in Figure 1c and 1d. It is particularly difficult to distinguish between the normal sphincter-active urethra which is seen to open up on a descending study, as opposed to a sphincter stricture below a funneled bladder neck which is rigid and therefore does not distend. Both antegrade and retrograde urethrography are therefore essential in evaluating this region. Even so, endoscopic assessment is almost always necessary to determine the site and extent of a contracture.

It is very difficult to look at the relationship between the radiological appearance and the presence of postprostatectomy incontinence in patients with BNC, because sphincter function is almost always compromised by the presence of the BNC (all patients are either incontinent or have obliterative contractures and are therefore unable to void urethrally) and even more so by the subsequent surgery.

A typical “funnel-shaped” appearance of the bladder neck is a common radiological observation after RP and distinguishing individual anatomical structures relating to the bladder base, VUA, and membranous and proximal bulbar urethra on MRI and urethrography is difficult on routine postoperative imaging. Funneling of the bladder neck may make localizing the exact position of a BNC problematic when planning reconstructive surgery in these patients.

The funneled area is often part of the BNC to a degree that is impossible to determine except at open surgical revision. This might explain the extensive nature of some of these contractures and why they are so often refractory to endoscopic management. It might also explain why surgery to revise the VUA in patients with postprostatectomy contractures is often a technically challenging undertaking.

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