

Chapter 2

Emergency and Elective Presentation of the Big Prostate

Oussama Elhage and Ben Challacombe

2.1 Introduction

The development of the very large prostate (>100 cc) is increasingly a recent phenomenon. In the previous decades prior to the introduction of medical therapy (mostly alpha blockers) for the symptoms of benign enlargement of the prostate and bladder outflow obstruction, the standard treatment was transurethral resection of the prostate. Therefore, most patients with an enlarged prostate who had symptoms were treated with an operation before their prostate reached large volumes. In the contemporary clinical practice, almost all patients are offered alpha blockers when they develop voiding symptoms. In the UK general practitioners can start treatment months or even years before the patient is referred to urologist [1].

Although androgens play an essential role in prostate development and growth in early adulthood [2, 3], there is however conflicting evidence of the effect of androgens on benign prostatic hyperplasia (BPH). It is suggested that the change in the testosterone/oestrogen ratio may play a role in the development of BPH [4]. The incidence of very large BPH remains very rare and most studies reporting the large prostate are case reports [5, 6]. The largest reported enlarged prostate is of the size of almost 4000cc [7]. This was measured on MRI and the report suggested it was treated conservatively. There is no consensus to what constitutes a very large prostate, some authors arbitrarily defined giant prostate hyperplasia for any gland measured above 200 g [8]. Most authors reporting the outcome on Holmium Enucleation

O. Elhage (✉)

MRC Centre for Transplantation, King's College London, London, UK

The Urology Centre, Guy's & St Thomas NHS Foundation Trust, London, UK

e-mail: oussama.elhage@kcl.ac.uk

B. Challacombe

The Urology Centre, Guy's & St Thomas NHS Foundation Trust, London, UK

e-mail: benchallacombe@doctors.org.uk

of the Prostate (HoLEP) or simple prostatectomy as a surgical treatment for very large BPH use 80 cc as a cut off size [9, 10].

Obesity has been shown to be associated with BPH. In a study of more than 1600 patients, Bhindi et al found a direct correlation between increased body mass index and prostate size. For every 5 kg/m² increase in BMI, the authors found a 2.1 mL increase in prostate size [11]. In a mouse model, obesity was found to cause voiding dysfunction [12]. Metabolic syndrome is implicated in lower urinary tract symptoms and prostate enlargement [13, 14].

Very large BPH may cause variety of symptoms or none at all. Patients are usually not aware of how large their prostate is and can present to the urology clinic with symptoms of bladder outflow obstruction, however there are peculiarities specific to the very large prostate.

We will explore the different types of presentation in this chapter.

2.2 Emergency Presentations

Patients who have very large BPH often may not realise how large their gland is and are completely unaware of the implications of this. They may develop the typical symptoms of bladder outflow obstruction with voiding symptoms and are usually started on alpha blockers for some time before their presentation. Occasionally patients can present acutely with one of the following.

2.2.1 *Haematuria*

The enlarged prostate is usually extremely vascular. Around 2.5% of men with BPH will present with haematuria [15]. The incidence is expected to be higher in very large BPH. the patient may develop microscopic or macroscopic haematuria. The patient is usually alarmed after one episode of visible blood; however non-visible haematuria may require multiple visits to the general practitioner before it is investigated. This would eventually lead to referral to urological service where the typical investigation would conclude that the patient has bladder outflow obstruction and an enlarged prostate. Occasionally patients develop recurrent haematuria requiring multiple admissions. However, a careful assessment would reveal the cause of the bladder outflow obstruction to be an enlarged prostate. Without the aid of adequate imaging or due to the patients body habitus, the assessing urologist may underestimate the size of the prostate at physical examination [16] and there is hence a risk of only realising how large the prostate is on endoscopy just before the start of transurethral resection. Recurrent haematuria can be treated with a 5 alpha-reductase inhibitor such as finasteride or dutasteride but if a significant problem then a procedure may be required. The options in the setting of huge BPH are

prostate artery embolisation (see Chap. 6) or if surgery is required then HoLEP, Greenlight PVP, TURP and open simple prostatectomy are also options.

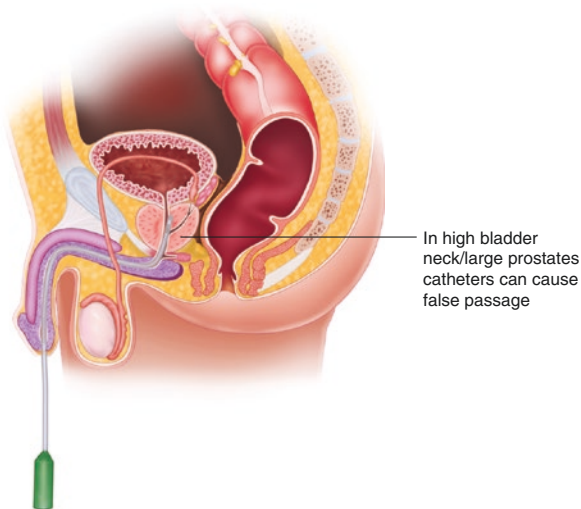
2.2.2 *Clot Retention*

Patients with very large BPH often develop more significant and dangerous haematuria compared to other patients with smaller prostates. Not all patients who present with haematuria will require admission or a catheter insertion. Admission is recommended if a visible haematuria is associated with difficulty in voiding and if there is drop in Hb level, and in most patients with anticoagulants other than aspirin (warfarin, clopidogrel, heparin). Patients will require a three-way catheter insertion if the haematuria is severe with clots, and the patient is experiencing difficulty in voiding. three-way catheter is a specific type catheter with three channels; one for inflating the balloon, one channel for the inflow of the irrigating fluid and once channel for the outflow. Insertion of this catheter is no different to the insertion of all other catheters; however, it is recommended that a larger gauge catheter is inserted, at least size 20 ch. The typical practice is to insert 22ch three-way catheter in a patient with haematuria who requires irrigation. The irrigation system consists of bag of irrigation fluid (Saline), tubing system to connect it to the inflow opening of the three-way catheter. The outflow opening of the catheter is attached to a catheter draining bag. The fluid is infused slowly in the bladder and drained continually in the draining bag. The aim is to avoid accumulation of clots in the bladder which can cause further bleeding and severe patient distress and discomfort. Patients who develop clot retention at presentation will require three-way catheter insertion and a manual bladder washout should be performed. Some patients will require evacuation of clots under rigid cystoscopy and an anaesthetic. This can be a challenging procedure fraught with difficulty as the size of the prostate may limit the access to the bladder. An extra long resectoscope may be required and a series of Ellick evacuators and bladder syringes will be required to remove the bladder clots. Following this emergency procedure it is wise to consent the patient for urgent elective treatment such as HoLEP, open simple prostatectomy or PAE (see subsequent Chaps. 6–11) to prevent a recurrence.

2.2.3 *Difficult Catheterisation*

Not infrequently patients may require catheterisation for urine output or tissue perfusion monitoring purposes or perioperatively following non-urological major operations and patients who have large BPH may present a challenge for catheterisation to the non-expert. Often urologists are called to help with catheterising a patient who otherwise didn't previously have symptoms only to find insertion of the

Fig. 2.1 In the large prostate, a common problem with catheterisation is to negotiate the acute angle and the high bladder neck. Standard catheters can fail to pass and may cause the formation of false passage. This may result in extreme difficulty in subsequent attempts at inserting a catheter



catheter is difficult beyond the prostatic fossa due to the enlarged prostate (Fig. 2.1). In these cases, a curved tip catheter (16Fr, Tiemann or coude tip) in case of bleeding can help negotiate the high bladder neck and middle lobe (Fig. 2.2). It is unwise to use a rigid introducer in these situations as a stricture or the prostate will lead to the formation of a false passage. One option is to pass a flexible guidewire down the urethra in the hope that it will gradually “find its way” into the bladder and then subsequently pass an open ended catheter over it. The safest and more secure way to catheterise in this situation is to use a flexible cystoscopy and directly pass a floppy guidewire under direct vision. Once the cystoscope is removed an open ended catheter is passed into the bladder.

2.2.4 Acute Urinary Retention

In a similar scenario to bladder outflow obstruction in enlarged prostate the very large prostate can cause bladder outflow obstruction and acute painful urinary retention. The patient would develop lower abdominal pain and inability to pass urine. the symptoms are usually identical to BPH except and in some cases, catheter insertion may prove to be difficult. Insertion of suprapubic catheter in these cases is fraught with danger as the part of the prostate may lie in the path of the suprapubic trocar and an unwitting insertion of such catheter may result in piercing of the prostate and subsequent catastrophic bleeding (Fig. 2.3). A radiologically guided insertion of suprapubic catheter in these cases is warranted. The likelihood of passing a trial of voiding is much less with a huge gland and therefore there should be a low

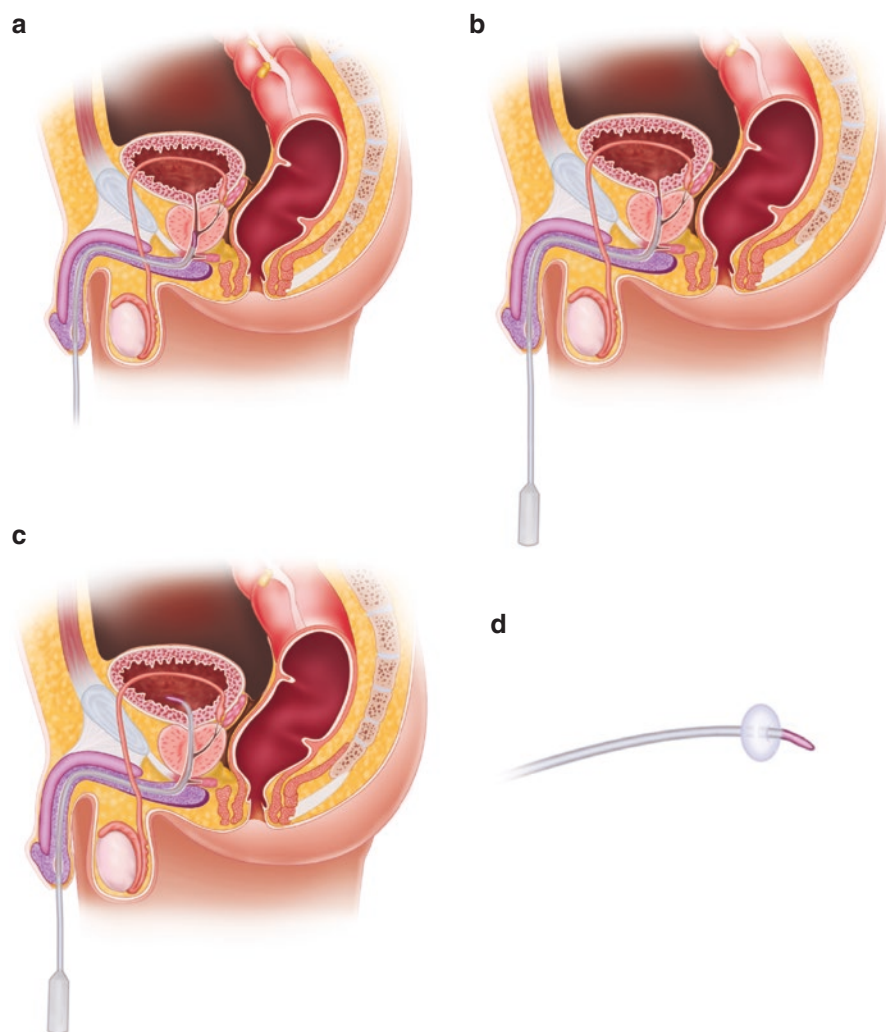


Fig. 2.2 (a–d) Tiemann tip catheter insertion in a patient with a large prostate. (a–c) The specially curved tip catheter is successfully able to negotiate the acute angle at the bladder neck and is passed into the bladder easily. (d) The shape of the tip of the catheter. Care should be taken when inserting this type of catheter as the concavity of the curve should face anteriorly otherwise a great deal of damage and false passage can be inflicted. Only a person who is familiar with this type of catheters and with the prostate anatomy should attempt at using it

threshold for moving onto bladder outflow surgery in these men. In addition to immediate failure to void following catheter removal, a subsequent episode of acute retention may lead to a difficult catheterisation and haematuria or the need to placement of a supra-pubic catheter thus pushing the urologist to operate sooner rather than later on these cases.

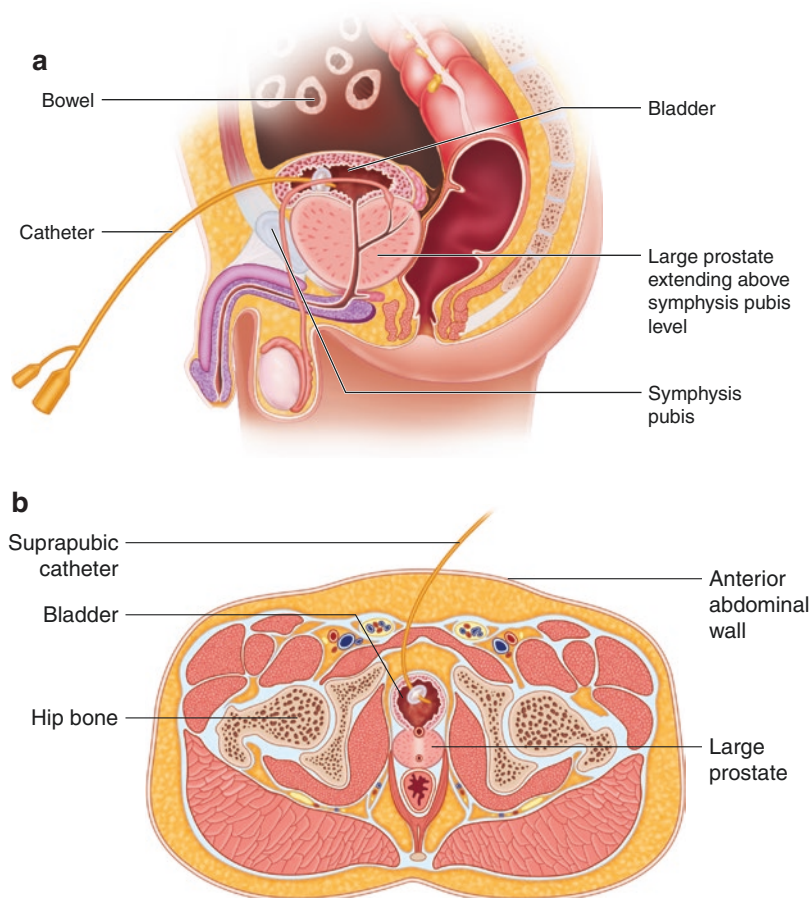


Fig. 2.3 (a, b) Insertion of suprapubic catheter in patient with large prostate can pose a huge challenge. (a) The prostate can be large enough and become an intra-abdominal organ. (b) A standard suprapubic catheter in this case is dangerous as it runs the risk of spearing the prostate which may result in catastrophic bleeding. To avoid the prostate, the surgeon may have to place the suprapubic catheter more proximally on the abdominal wall; this in turn runs the risk of bowel injury. A more cautious approach would be to insert the suprapubic catheter in the interventional radiology suite under imaging guidance

2.2.5 Acute Renal Insufficiency

Occasionally some patients may present with signs of renal failure with high pressure urinary retention. These patients need urgent catheter insertion and acute management of their renal failure. Concurrent renal impairment can result from decreased GRF and can lead to abnormal creatinine. A scan of the urinary tract will usually reveal hydronephrosis. An urgent admission to the urology ward is required. This serves two purposes, first is to monitor and correct any diuresis which might ensue

following catheterisation. Post catheterisation diuresis develop almost immediately following catheter insertion. A high urine output without adequate compensation in fluid intake would rapidly lead to dehydration and hypovolaemia, a dangerous state if the patient is at home. Therefore, all patient with suspected diuresis are kept in the hospital. Their vital signs and urine output should be monitored hourly in the first few hours of diuresis. However fluid replacement strategy should be based on average output over several hours rather than very short period. The typical replacement is normal oral fluid if the urine output is less than 200 ml/hr. The patient is usually able to drink one cup of fluid an hour. If the urine output is higher than 200 mL/h, an iv fluid replacement might be necessary with saline. Daily patient weight should be measured and recorded in a special log, this will give an indication if the fluid replacement is adequate. Blood electrolyte should be monitored daily till diuresis resolves.

The second purpose of admission is to monitor renal function. Blood creatinine level can initially rise sharply. The renal function typically improves to almost pre-retention level especially if the acute episode was treated promptly with catheterisation. Patients can present with acute on chronic urinary retention and the renal function in such cases may not recover fully. In all cases of urinary retention and renal insufficiency the patient is discharged home with indwelling catheter and any attempt at removing the catheter without definitive treatment risk further deterioration of renal function. A definitive bladder outflow surgery will be required if the patient is fit for anaesthetic. The alternative would be prostate artery embolization in selected patients, especially the elderly and frail. In some cases the interventional radiology specialist will be able to insert a suprapubic catheter at the same sitting of prostate artery embolization. The patients who undergo prostate artery embolisation will be expected to keep their indwelling catheter for several weeks after the procedure.

2.2.6 Urine Tract Infections

Many patients may present with recurrent lower urine tract infections. This may be associated with lower urinary tracts symptoms or not and occasionally patients may require hospitalisation for infection treatment in severe cases. Urine infection can be caused by stagnation from a high residual volume of urine that is not cleared after each void because of bladder outflow obstruction. Patients who require catheterisation because of retention may develop urinary infection as well. Another cause of urine infection can be the presence of bladder stones.

2.2.7 Bladder Stones

The formation of bladder stones is typically uncommon in the modern age however patients with a very large prostate are an exception and may develop primary bladder stones. Urinary stasis and high residual in addition to recurrent urine tract

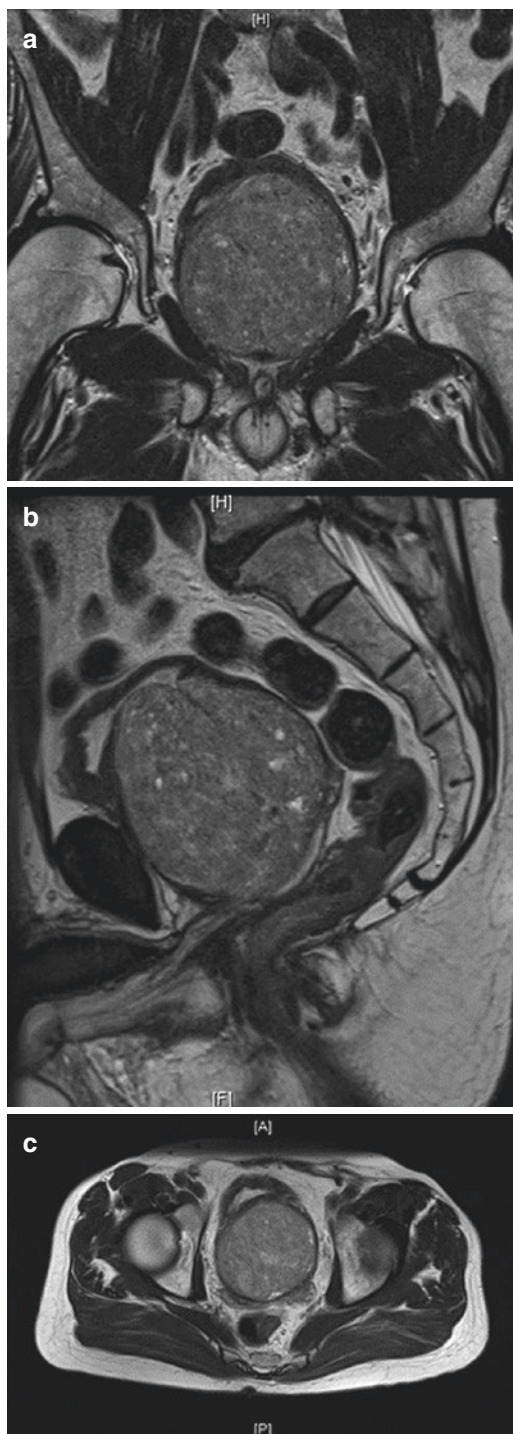
infection are predisposing factors. The symptoms can range from storage lower urinary tract symptoms especially dysuria and occasionally recurrent urine tract infections. Bladder stones occasionally can be asymptomatic if they are small. It is important to assess the size and the number of bladder stones as this will have implication on treatment planning. If bladder calculi are present at the time of bladder outflow surgery these can often be managed simultaneously under a single anaesthetic. If using a Greenlight PVP system or TURP then a stone punch can be utilised to crush the calculi before removal with the Ellick. If performing HoLEP then the calculi can be elegantly dusted into small fragments using the same Holmium laser. With open or robotic simple prostatectomy then the calculi can be simply lifted out. Whichever way the stones are removed it is important to minimise mucosal bleeding from sharp stone fragments which can complicate the prostate part of the surgery.

2.3 Elective Presentations

2.3.1 *Elevated PSA in the Large Gland*

Prostate specific antigen (PSA) level has been shown to correlate with the size of the prostate [17]. Roehrborn et al analysed more than 4600 patients from BPH trials and found PSA level and the size of the prostate are strongly inter-related. This relationship was independent of prostate cancer but was dependent on age. Older patient with larger prostates had higher PSA levels. The largest prostate volume in the trials recorded was at 70 g. This has led to the concept of PSA density which is the serum total PSA level divided by prostate volume. A value of 0.15 is generally used as the threshold level for increased suspicion of prostate cancer. Therefore, very large BPH is expected to be associated with elevated PSA and in prostates over 100 cc in size it is not unusual to find a PSA level of around 10–15 ng/mL or greater, which may in fact be normal for a prostate of that size. Patients who are otherwise asymptomatic may therefore present to urologists with an elevated PSA. This usually causes one of the most difficult dilemmas in managing patients with very large BPH. In majority of the cases the moderately elevated PSA is a factor of the benign enlargement of the gland (Fig. 2.4). However, an elevation of PSA above the normal level would traditionally trigger a diagnostic process that would end with a prostate biopsy. Patients with very large prostates may be at higher risk for under-sampling of the anterior and apical regions and the prostate in general, and thus record false negative biopsy results. There is also an increased risk of significant haematuria, worsening lower urinary tract symptoms and increased rates of urinary retention post biopsies in very large glands. This dilemma is not easily solved as both large BPH and prostate cancer are common and can often co-exist. And the management should be tailored to each patient. A careful discussion should be undertaken and any decision to proceed with prostate biopsies should only be undertaken after full counselling ensuring the patient is aware of these specifically increased risks.

Fig. 2.4 (a) MRI of prostate—coronal view. (b) MRI of prostate—sagittal view. (c) MRI of prostate—axial view. (a–c) A Large prostate on a MRI scan on of a 75 year old man with LUTS, IPSS: 27/35, the volume of the prostate was calculated at 270cc. This patient underwent Holmium laser enucleation of the prostate and pre- operative PSA was 7. Post-operatively PSA: 0.69



A multi-parametric MRI (1.5 or preferably 3 Tesla) with an experienced uro-radiologist can play a very helpful role in selecting which patients should go forward to prostate biopsies. As well as showing potential areas of prostate cancer, the prostate size and shape, it can also identify signs of bladder outflow obstruction such as bladder thickening, calculi, diverticula, hydronephrosis, and prostatic middle lobes. Many patients with a reassuring PSA density (<0.15 ng/mL/cc) and no obvious signs of cancer may be able to avoid biopsy. Indeed a mildly elevated PSA with a non-suspicious MRI (PIRADS score 1 or 2) can be safely followed up with regular PSA and occasional MRI without the need for prostate biopsies.

2.3.2 Incidental Imaging

Patients who are incidentally found to have a very large prostate can be referred to urology services for full lower urinary tract symptoms assessment which may include digital rectal examination, serum creatinine, urine analysis, flow rate and bladder residual in addition to urinary tract ultrasound scan. Should the patient be found not to have any bothersome symptoms with no evidence of bladder outflow obstruction then they can be safely followed up with renal function, IPSS score and regular flow rate at the primary care level.

Occasionally a bladder ultrasound scan can report a large bladder tumour erroneously which eventually is revealed to be a large middle lobe of the prostate [18].

2.3.3 Lower Urinary Tract Symptoms

Most patients with a very large prostate will experience some lower urinary tract symptoms and may present with these issues. Although many men will have primarily voiding symptoms, a high percentage of these patients will have mixed storage and voiding symptoms due to excessive voiding pressures causing secondary detrusor over-activity. In these patients often the offending element is the very large middle lobe that is intruding into the bladder. This intrusion contributes to the storage symptoms and medical therapy is usually less effective. The anatomy of the middle lobe is different from the lateral lobes of the prostate. The lateral lobes surround the prostatic urethra at the bladder neck where the effect of alpha blockers and 5-alpha reductase inhibitors would be maximal. If the clinical assessment reveals a very large prostate >100 cc then there should be a low threshold for medical or eventually surgical intervention. Although the usual pathway is to start an alpha-blocker in isolation, these men are more likely to benefit from combination therapy with a 5-alpha reductase inhibitor initiated at an early stage. This will be more likely to prevent the need for bladder outflow surgery and urinary retention. If symptoms fail to respond to medical therapy it is often due to a large middle lobe indenting into the trigone, acting like a ball-valve, and cause voiding symptoms. These patients do not usually benefit from medical therapy and are best treated with bladder outflow surgery earlier rather than later.

2.3.4 *Mass Effect*

This is a relatively unusual presentation. Patients can feel a continuous fullness in their rectum (tensemus) and complain of difficulty in defecation. This is due to the very large prostate filling most of the space in the pelvis in addition to the increased voiding pressures at the time of micturition. Some relief will be provided by medical therapies but there should be a low threshold for bladder out-flow surgery.

2.3.5 *Asymptomatic*

Some patients with very large prostate may remain very well without any symptoms. In a case reported by Dominguez [7], a patient with a prostate measured at almost 4000 mL has remained asymptomatic without any signs of bladder out-flow obstruction and avoided surgery. However, the patient remained under urological follow up.

2.4 Summary

- Patients with very large prostate can be asymptomatic
- Very large prostate can be mistaken for bladder cancer on imaging
- Large prostate may require special curved catheters in case of retention
- Large prostate can cause problematic recurrent haematuria which can be difficult to manage
- Blind suprapubic catheterisation is not recommended in men with very large prostates
- PSA can be elevated in very large prostate; mp-MRI and PSA density can help identify patients at risk of prostate cancer

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