

# BLADDER AND PROSTATE

## MUSEUM CATALOGUE

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## BLADDER AND PROSTATE

### INTRODUCTION

The pathology of the bladder and prostate is for the most part quite straightforward, dealing with either benign prostatic enlargement, carcinoma of the prostate or carcinoma of the bladder. Occasional examples are also given of more unusual pathologies.

The prostate gland is situated beneath the bladder and encircles the urethra. It is about the size and shape of a walnut. Histologically it comprises branching glands and ducts lined by two layers of cells; the secretory cells line the lumen with the basal cells underneath sitting on the basement membrane. The glands are embedded in a fibromuscular stroma and the entire structure is enveloped by a capsule, sometimes less well-defined than others.

The bladder is a hollow viscus shaped like an inverted pyramid. The layers of the wall are the mucosa (urothelium/transitional epithelium with lamina propria and a discontinuous muscularis mucosae), muscularis propria (smooth muscle) and adventitia, the latter being covered by serosa at the dome.

Any comments on this catalogue are welcome. Please contact a member of the department.

### HOW TO USE THIS CATALOGUE

This catalogue is to be used as a tool to develop your knowledge as well as provide an opportunity for revision.

It is divided into:

- Introduction and approach to specimens (pages 50-51).
- Index (pages 52-53). Examples of specific diagnoses can be found via the index.
- Core and classic disease processes (pages 54-59). This gives examples and discussion of core and/or classic diseases of the bladder and prostate. These are the specimens that students should focus on being able to identify initially. However, it depends to some extent on what you have covered in lectures and practical classes or resource sessions as to what you should know. Some of the specimens and discussion are directed more towards clinical medical students.
- Main catalogue (pages 60-69). This section covers the specimens in numerical order. Questions and/or comments accompany some of the specimens to help you expand your knowledge. In order to fit more specimens in the museum, not all of the pots are in numerical order on the shelves, and large specimens are often found on the bottom shelves.

You might find it useful to work quietly with a few friends and to have a pathology textbook handy.

You do not have to examine every single specimen in the museum. However, just as in clinical practice, you will not become proficient in diagnosing something if you have only seen one case. Exposure to a variety of cases (specific diagnoses can be found via the index) to experience the variability in morphology will help your learning greatly. In general the red and blue dots on the pots indicate basic and straightforward pathology, whereas yellow dots tend to indicate less readily diagnosable conditions. This is not a hard and fast rule, and you will find yellow dot specimens turning up in resource sessions/practical classes and even exams, if they represent classic pathology.

As some of these specimens are very old (some up to 80 years), some of the investigations and treatments mentioned may be out of date.

### Limits to diagnosis on macroscopic examination

In all cases a diagnosis is given, but it is important to realize that sometimes the final diagnosis was only made based on the clinical history and histological examination. In some cases the macroscopic appearance is classic and even without the history and histopathological features you should be able

to make the diagnosis from the appearance, in others, it might only be possible to give a list of differential diagnoses or a more general diagnosis.

## BASIC APPROACH TO INTERPRETATION AND DESCRIPTION OF BLADDER AND PROSTATE PATHOLOGY SPECIMENS

This is similar to that for all specimens and includes the famous rules:

- Read the clinical history if given, it will often provide relevant information
- Always look at the front of the pot first (i.e. the one with the number and the dot) but always make sure to look at the back and sides as well
- Determine what tissues are present
- Identification of and description of the abnormality.
  - Is the organ of normal size, too small or too large?
  - Is the abnormality focal, diffuse (involving the entire organ, region or tissue) or multifocal? The lesion itself should then be described.

To describe a specimen you need to be able to use the correct terminology to communicate the nature of the pathology that is present.

### Focal lesion

Features that may be relevant in descriptions include:

- Colour: What colour is it? Is it all one colour or is it many colours (variegated)? Does it look homogenous (all the same the whole way through)? Patchiness in colour or discoloured greyish areas in a tumour suggest necrosis.
- Size: You can give an approximate measurement but don't get too obsessive
- Shape
- Consistency: This is of course difficult when the specimen is in a pot and you are unable to touch it, and who would want to anyway? But even just by looking you can get some idea: Does it look solid? Does it look friable (as if it's falling to pieces) to suggest necrosis or soft, suggestive of pus?
- Margins
  - Are they well-defined/well-demarcated – i.e. is there a clear line between the lesion and the adjacent normal tissue – or irregular or diffuse - where the line between the lesion and the adjacent normal tissue is more difficult to trace?
  - Malignant lesions typically have diffuse/irregular or infiltrative margins and benign tumours often have well defined and sometimes encapsulated (surrounded by a band of fibrous tissue) margins. In practice, benign neoplastic lesions are rare in the prostate and bladder.

### Multifocal

This means that there is more than one distinct lesion within the specimen. All the above comments regarding the description of focal lesions apply here as well. In addition, it may be important to note any differences between the lesions.

### Diffuse lesions

Diffuse processes affecting the bladder include inflammation and muscular hyperplasia. The main one affecting the prostate is hyperplasia in which the prostate is enlarged, typically with a nodular cut surface, and the capsule is intact. The prostate carcinomas in the collection for the most part are quite advanced, having invaded with irregular margins into tissues outside the prostatic capsule and often having metastasised to local pelvic lymph nodes.

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# CORE AND CLASSIC DISEASE PROCESSES

## CARCINOMA OF THE BLADDER – LOW GRADE

### CASE 10602

#### Clinical information

A man aged 71 died from the effects of a large lung abscess and a perforated pyloric ulcer of the stomach. The specimen was an incidental finding at post-mortem.

#### Describe the specimen

The specimen is of bladder and prostate. There is a 15mm diameter lesion composed of thin fragile fronds protruding into the lumen of the bladder on the right above the trigone. The prostate is mildly enlarged.

#### What is the diagnosis?

Papillary transitional cell carcinoma

#### Is this tumour likely to be well or poorly differentiated? Why?

It is likely to be well-differentiated. Only the better differentiated transitional cell carcinomas of the bladder have a papillary architecture. More poorly differentiated tumours (and also squamous cell carcinomas and adenocarcinomas of the bladder) have a more solid and infiltrative architecture.

#### What type of epithelium lines the bladder and ureters? Is it simple or stratified?

Transitional epithelium (urothelium) – it is stratified.

## CARCINOMA OF THE BLADDER – HIGH GRADE

### CASE 10377

#### Clinical information.

A man of 52 had a 5 week history of urinary frequency, dysuria and haematuria. Treatment with antibiotics had led to some improvement in his symptoms, but the haematuria continued and in the last week before his admission it became profuse. On rectal examination a large mass involving the left lobe of the prostate was palpable. Cystoscopy was attempted but failed because of the severe haematuria. An indwelling catheter was inserted but became blocked by clots. He died after 3 weeks in hospital. At post-mortem there was marked bilateral hydronephrosis particularly on the left side, and the bladder was distended with a little urine and a large amount of clotted blood.

#### Describe the specimen

The specimen is of the bladder and prostate. A large poorly defined infiltrating tumour measuring approximately 10cm in diameter arises on the posterior wall of the bladder. The surface of the tumour is irregularly lobulated with some necrosis and haemorrhage. Tumour invades the bladder wall that is focally thickened to 2.5cm.

#### What is the diagnosis?

Carcinoma of the bladder

#### Is this tumour likely to be well or poorly differentiated? Why?

It is likely to be poorly differentiated as it has a solid infiltrating pattern.

#### What are the main histological types of bladder carcinoma?

The commonest (90%) is transitional cell carcinoma. The other main types are squamous cell carcinoma and adenocarcinoma.

#### What are the predisposing factors for this disease?

Cigarette smoking, industrial exposure to aniline dyes and arylamines, Schistosoma haematobium infection, exposure to cyclophosphamide and bladder stones predispose to bladder cancer of various types. Some of these agents are secreted in the urine, and since such exposure will affect the entire urinary tract, multiple tumours are not uncommon. Some of the risk factors cause chronic irritation and predispose to the development of squamous cell carcinoma via causing squamous metaplasia and dysplasia.

#### In what age group and gender is this disease most frequent?

Middle-aged and older males.

#### Comment

The majority of transitional cell carcinomas arise in the bladder. An in situ stage of transitional cell carcinoma is recognised (i.e. severe dysplasia of the transitional epithelium). Low-grade lesions have a papillary growth pattern, are generally only superficially invasive and are covered by epithelium that may range from well to moderately differentiated. High-grade carcinomas tend not to have a papillary growth pattern, being more solid and deeply infiltrative and are composed of poorly differentiated cells. Recurrences in patients with low-grade lesions are common, the recurrence, however, often having a higher grade than the original lesion.



## PROSTATE: TUBERCULOSIS

### CASE 24410

#### Clinical information

The patient was a man aged 58 who had a past history of tuberculosis, for which he had undergone a pneumonectomy 21 years previously, and a myocardial infarction 14 years previously. He presented with anaemia and joint pains. Bone marrow biopsy showed a sub-leukaemic phase of acute myeloblastic leukaemia. He died of septicaemia.

#### Describe the specimen

The specimen comprises prostate and bladder. The prostate shows irregular pale areas of caseous necrosis throughout. The urethra runs relatively straight. There is obvious infiltration in the region of the trigone to form a ridge along the posterior wall of the base of the bladder and there are some superficial ulcers on the trigone.

#### What is the diagnosis?

Tuberculous prostatitis

#### What is the pathogenesis of this disease?

Tubercle bacilli can access the blood stream from the lungs and disseminate to various areas of the body where they can lodge and cause infection. This may take the form of miliary tuberculosis where there is generally disseminated infection arising acutely, or isolated organ tuberculosis (this case), chronically involving one or several organs.

## NODULAR HYPERPLASIA OF THE PROSTATE

### CASE 20139

#### Clinical information

This was an incidental finding in a man aged 77 who died from carcinoma of the lung with superadded bronchopneumonia.

#### Describe the specimen

The specimen is of a coronal section through the bladder and prostate. It shows nodular enlargement of the prostate affecting the left lobe more than the right and causing marked narrowing of the prostatic urethra. There is marked trabeculation of the bladder wall.

#### What is the diagnosis?

Nodular hyperplasia of the prostate

#### In which region of the prostate does hyperplasia typically arise?

In the inner parts of the gland, around the urethra.

#### Why does the trabeculation arise?

The trabeculation represents hypertrophied smooth muscle in the bladder wall. The muscle hypertrophies in an attempt to push urine through the narrowed urethra.

#### Comment

Nodular hyperplasia of the prostate is a common condition in men over 50. Symptoms develop as a result of compression of the urethra with difficulty in urination and retention of urine in the bladder. Secondary changes in the bladder include muscle hypertrophy with trabeculation and diverticula formation. Acute and chronic urinary retention with secondary infection and even chronic renal failure as a result of hydronephrosis and chronic pyelonephritis may also develop.

Its causes are unknown, however, androgens are important as prepubertal castration prevents its subsequent development. The enlargement of the gland results from hyperplasia of both glandular and stromal elements. Macroscopically the cut surface typically shows a nodular appearance.

Most studies have not found any association between carcinoma of the prostate and hyperplasia, so it should not be considered as a pre-malignant condition.

## CARCINOMA OF THE PROSTATE

### CASE 20154

#### Clinical information

The patient was a man aged 79 who had had a prostate operation 5 years previously. At the operation a carcinoma of the pelvic colon was also discovered, and this was removed 3 months later. Eighteen months thereafter a further carcinoma of the ascending colon was found and it too was resected. Six months later he had a stroke involving the right arm and leg with aphasia. On his last admission the bladder was enlarged and rectal examination found a grossly enlarged prostate. He died a week later of bronchopneumonia.

#### Describe the specimen

The specimen consists of the prostate, bladder, ureters and kidneys. The prostate is replaced by an irregular tumour with ill-defined margins measuring 4 x 6 x 5cm that invades through the capsule and protrudes as an irregular mass into the base of the bladder. The bladder is small and not particularly hypertrophied, but both ureters are dilated and both kidneys show dilated pelves and calyces. There is irregular scarring of the kidneys suggestive of chronic pyelonephritis. An irregular tumour mass, possibly representing nodal metastasis, is present along the right ureter.

#### What is the diagnosis?

Prostate carcinoma with local periureteric metastases and bilateral hydronephrosis

#### How has the bilateral hydronephrosis developed?

It has developed as a result of obstruction of both ureters by the tumour as they enter the bladder. Urine builds up in the ureters and ultimately the renal pelvis and calyces leading to their dilation. With time, this leads to pressure atrophy of the overlying renal parenchyma.

#### What other complications may develop as a result of the underlying disease?

Local: Cystitis, acute urinary retention, acute pyelonephritis, chronic pyelonephritis and chronic renal failure.

Metastatic: Symptoms from metastases e.g. vertebral bone pain

Other: Malaise, anorexia

#### Comment

Prostate carcinoma is the most common internal cancer in males, typically developing over the age of 50. It is especially prevalent among American blacks and is rare in Asians. Little is known about the causes of prostate cancer, however, in some cases there is a familial predisposition, hormonal factors are important, and dietary factors have also been implicated.

In most cases the tumour arises in the periphery of the gland, so that symptoms related to urethral compression may develop relatively late. Prostatic carcinomas are typically adenocarcinomas and can be graded histologically using the Gleason grading system.

PIN – prostatic intraepithelial neoplasia - is a presumptive precursor lesion of prostate cancer. These lesions are essentially dysplastic in nature, demonstrating cytological and architectural atypia of the epithelial cells, but the basement membrane is intact with no invasion.