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2 Anatomy of kidneys, urinary tract and male genitalia

The urinary tract (organa urinaria) can be divided as following (fig. 2.1):

1) organs, that **produce urine** — kidneys;
2) organs, that **excrete urine**:
   - ureters;
   - bladder;
   - urethra.

From the clinical point of view, the urinary system is divided into **upper** urinary tract (minor and major calices, renal pelvises, ureters) and **lower** urinary tract (bladder, urethra).

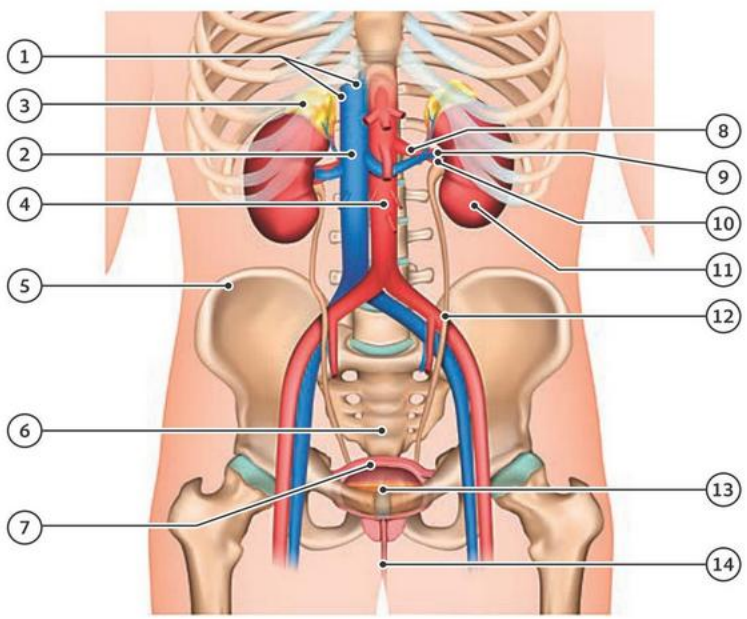

Figure 2.1. Pelvic and retroperitoneal organs. *Anterior view*:

1 — hepatic veins; *2* — inferior vena cava; *3* — right adrenal gland; *4* — aorta; *5* — iliac crest; *6* — sacrum; *7* — bladder; *8* — renal artery; *9* — renal hilum; *10* — renal vein; *11* — kidney; *12* — ureter; *13* — pubic symphysis; *14* — urethra

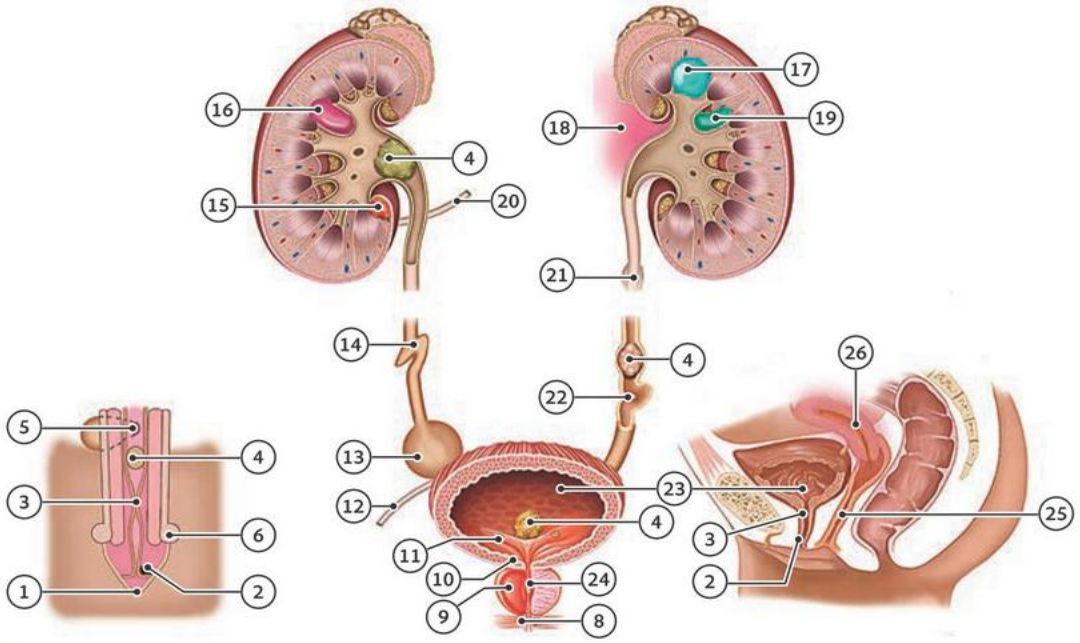

Figure 4.4. Possible causes of pyuria (direct and indirect):

1 — phimosis; *2* — meatal stenosis; *3* — urethral stricture; *4* — urinary stones; *5* — urethral diverticula; *6* — paraphimosis; *7* — folliculitis; *8* — congenital posterior urethral valves; *9* — prostatitis, prostatic abscess; *10* — bladder neck stenosis; *11* — ureteropelvic junction obstruction; *12* — compression of the lower ureter by the vessel; *13* — compression of the ureter by the bladder diverticula; *14* — ureter kinking; *15* — kidney tumor; *16* — renal tuberculosis; *17* — pyelonephritis; *18* — perinephric phlegmon; *19* — pyonephrosis; *20* — compression of the upper ureter by the accessory vessel; *21* — ureteral stricture; *22* — hydroureter; *23* — neuromuscular dysfunction of bladder; *24* — verumontanum hypertrophy; *25* — vaginitis; *26* — endometritis

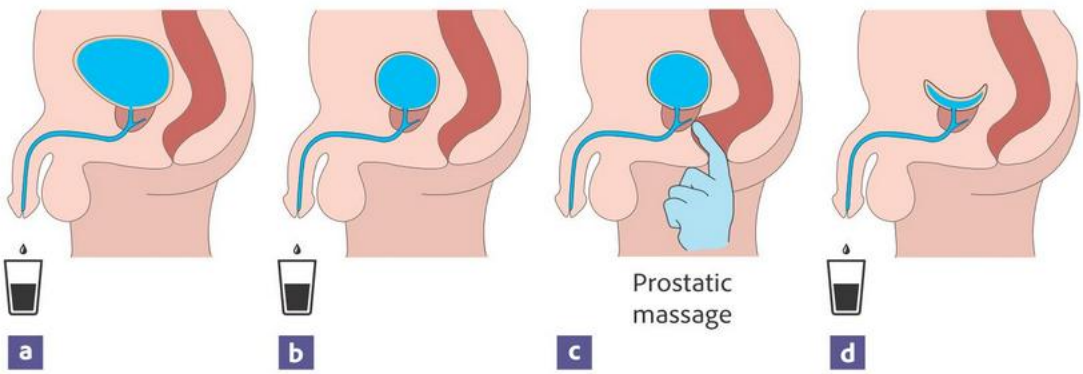

Figure 4.5. Three-glass test

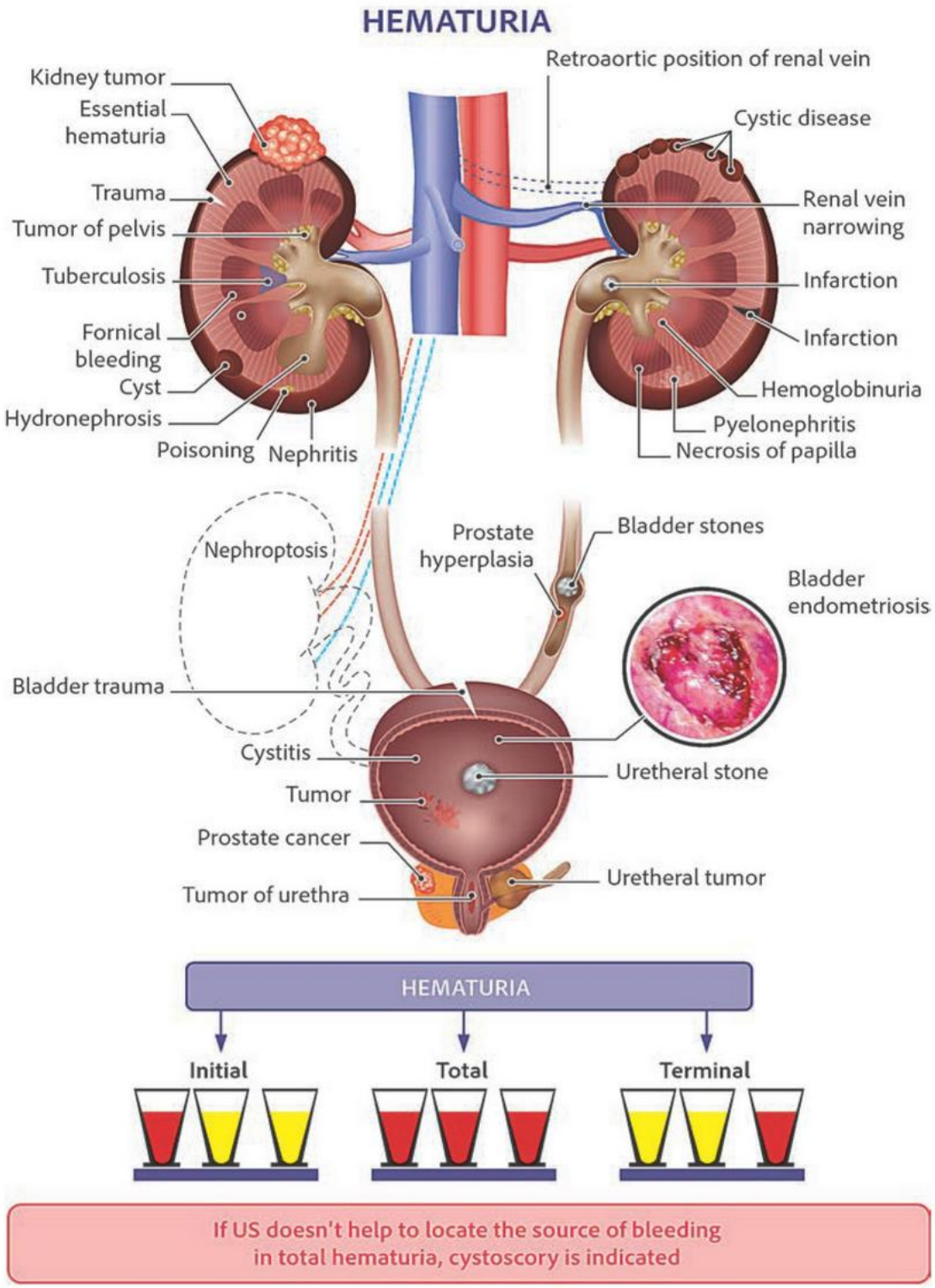

Figure 10.1. Causes and types of hematuria

Figure 12.2. Nelaton's catheters

Catheterization. At the beginning, it is necessary to rinse meatus by water antiseptic solution (e.g., 0.01 % chlorhexidine). Further, inject 20 ml of sterile water-based gel into meatus. A gel, containing local antiseptic such as lidocaine, is preferable. Vaseline jelly can be also used. Both gel and catheter should be inserted carefully and slowly.

To facilitate the insertion of a catheter, the penis should be held at the right angle to the anterior abdominal wall and slightly tightened. Fill a balloon of Foley's catheter only after confirming, that not only tip of the catheter, but the balloon is in the bladder. Urine should flow without interruptions or, if the bladder is empty, saline injected through the catheter should easily flow back. In order to prevent inflation of the balloon in the urethra, it is recommended to insert the catheter to its distal end, then inflate the balloon and slightly pull the catheter. If Foley's catheter cannot be advanced into the bladder due to an obstruction in the urethra, Timann's catheter should be used, since it has curved and stiffer tip. Don't make several attempts to advance the catheter. If it cannot be advanced, cystostomy should be put. In case of large prostate, it is often easier to use larger catheter, since it is stiffer. Urethral catheter can bend in prostatic fossa after transurethral resection of the prostate. In such cases, simultaneous digital rectum palpation of the prostate can facilitate an advancement of the catheter.

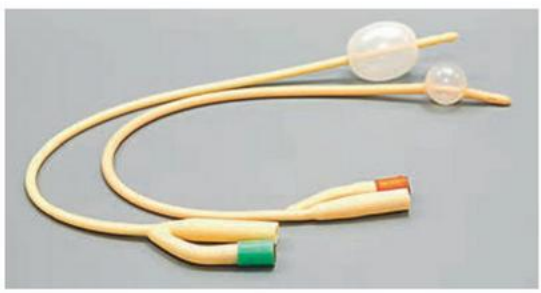

Figure 12.3. Foley's catheters

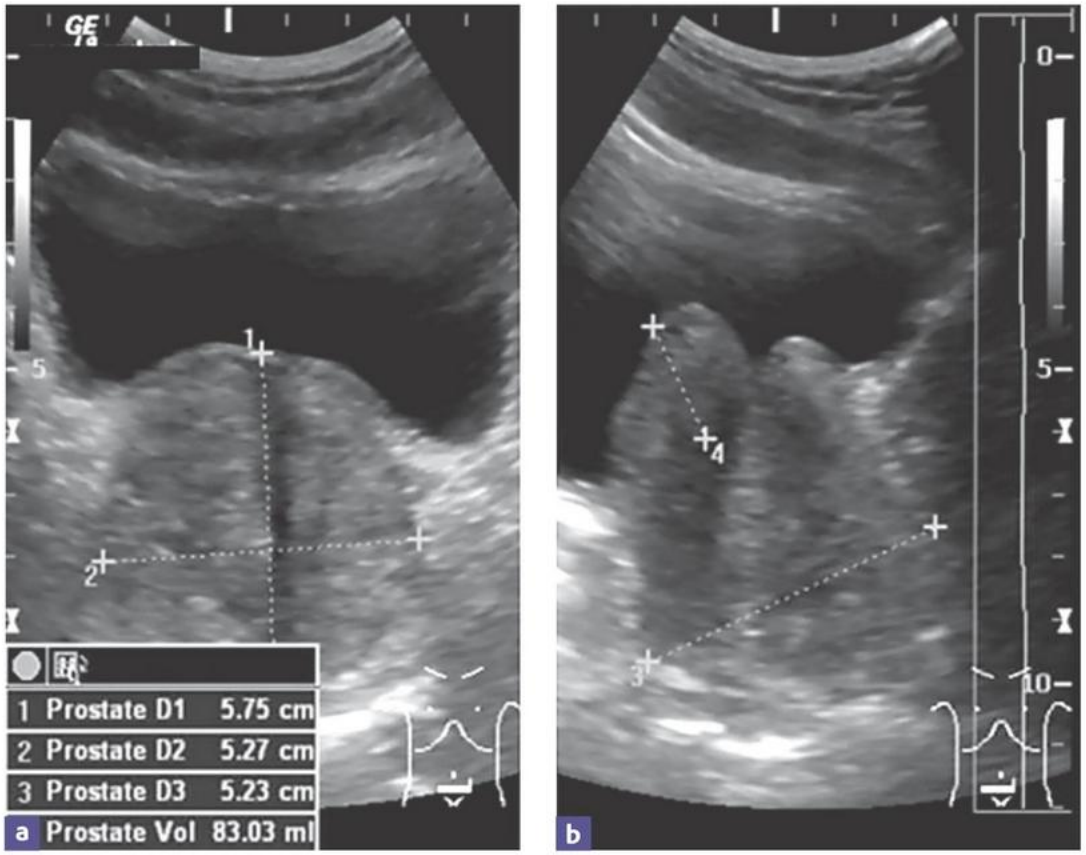

Figure 17.2. Ultrasound study
BPH with a prominent middle lobe

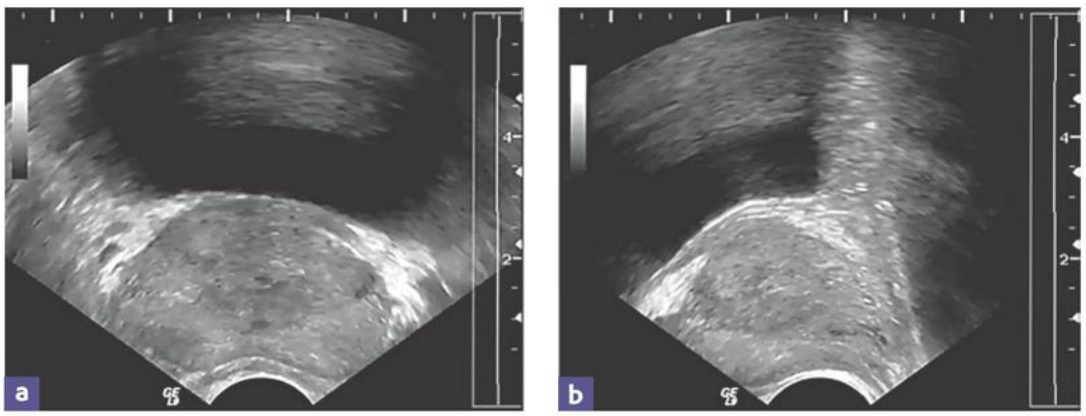

Figure 17.3. TRUS in patient with BPH