

discovery of a large residual volume after micturition is a relative contraindication to the use of certain drugs. Available drugs act at different sites of the neurogenic pathway that controls micturition (Table 5.2; Figure 5.3).

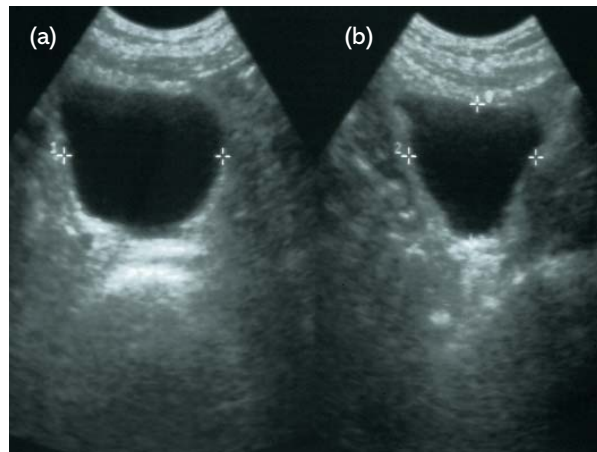


Figure 5.2 Ultrasound scans showing the bladder (a) before micturition and (b) after micturition, with a large residual volume. The cursors (+) mark the bladder-wall boundaries.

TABLE 5.2

Drugs for bladder symptoms

Drug	Site and mode of action
Anticholinergics (e.g. propantheline, oxybutynin, tolterodine)	Reduce detrusor hyperreflexia
Cholinergics	Enhance detrusor activity
α -sympathetic blockers (e.g. indoramin)	Relax smooth muscle, including the internal sphincter
Antispastic agents (e.g. baclofen)	Relax tone in the external sphincter
Vasopressin analogs (e.g. desmopressin)	Reduce urine production (for the management of nocturia)

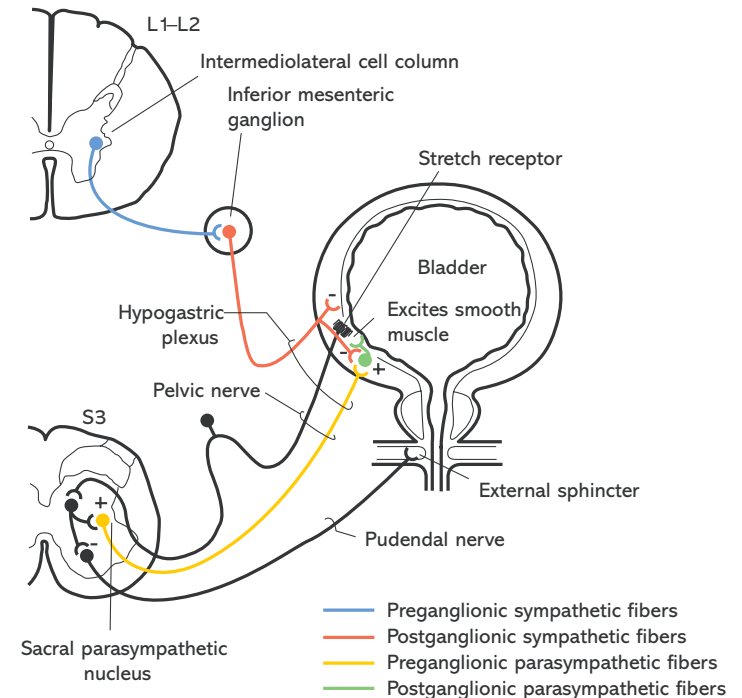


Figure 5.3 Bladder innervation: parasympathetic stimulation leads to contraction of the smooth muscle and relaxation of the urethra, resulting in voiding, while the role of sympathetic innervation of the bladder neck in preserving continence remains uncertain.

Urge incontinence. For patients with urge incontinence (due to detrusor hyperreflexia), the drugs of choice are:

- oxybutynin, 5–15 mg daily (in divided doses)
- propantheline, 30–90 mg daily (in divided doses)
- tolterodine, 2–4 mg daily (in divided doses).

Alternatively, a tricyclic antidepressant (e.g. amitriptyline) may be given as a single dose at night. The use of all of these drugs is limited by anticholinergic side effects (e.g. dry mouth and constipation). If they lead to an increasing urinary residual volume, their use must be reconsidered (Case history 5.2). Desmopressin, 10–20 μ g at night, is helpful in younger patients with nocturnal frequency and incontinence. Care should be taken to avoid fluid overload.