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Reversible detrusor acontractility associated with heavy cannabis use: A case report

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ABSTRACT

Cannabinoids affect lower urinary tract function, but clinical evidence linking cannabis to urinary retention is limited. We report a 22-year-old healthy male with acute urinary retention and isolated detrusor acontractility despite normal neurological and urological evaluation. History revealed markedly increased cannabis use in the weeks preceding symptom onset. Four months later – with absolute abstinence from cannabis – bladder function fully recovered with restoration of normal detrusor activity and spontaneous voiding. This case suggests that cannabis use may represent a reversible cause of urinary retention and should be considered in the differential diagnosis of unexplained urinary retention in young adults.

1. Introduction

Acute urinary retention represents a common urological emergency most frequently associated with bladder outlet obstruction, neurological disease, or medication effects. Drug-induced urinary retention is well described for several pharmacological classes, most notably anticholinergics, opioids, alpha-agonists and certain psychotropic medications.[1]

Cannabis is increasingly used worldwide for recreational and medicinal purposes. Cannabinoids exert their effects primarily through activation of cannabinoid receptors CB1 and CB2, which are expressed in the lower urinary tract.[2] Experimental studies suggest that activation of these receptors modulates bladder sensation and contractility without impairing the function of the striated rhabdosphincter.[3,4] In animal models, pharmacological manipulation of the endocannabinoid system has additionally been shown to influence bladder compliance and efficiency of bladder emptying, supportinga regulatory role of cannabinoids in lower urinary tract function[5,6]. In patients who used cannabinoids, available clinical evidence remains limited. Nevertheless, cannabinoids have been proposed as potential agents for symptomatic relief of lower urinary tract symptoms. In patients with multiple sclerosis cannabinoid-based therapies have demonstrated partial improvement in urinary storage symptoms, including urinary incontinence, frequency/urgency and nocturia[7]. However, clinical data in humans remain limited, inconsistent, and at times conflicting. Notably, observational data from a study in young men suggested that regular tetrahydrocannabinol users were less likely to develop lower urinary tract symptoms, highlighting the complexity and heterogeneity of cannabinoid effects on bladder function[8].

Despite increasing experimental and clinical interest in the effects of cannabinoids on lower urinary tract function, their role in disorders of bladder emptying remains poorly defined. Clinical evidence linking cannabis use to urinary retention is limited. We report a case of reversible detrusor acontractility associated with heavy cannabis consumption in a young healthy patient.

2. Case presentation

A 22-year-old previously healthy male presented to our uroneurological outpatient clinic with acute urinary retention. He reported no prior lower urinary tract symptoms, chronic illnesses, surgeries, or regular medication use. Additional history obtained from his mother confirmed normal childhood development without enuresis or delayed continence.

Symptoms began gradually over one to two days, initially presenting as difficulty emptying the bladder with abdominal straining, which progressed to complete urinary retention requiring catheterization. The patient reported preserved bladder filling sensation but inability to void. Bowel and erectile functions were normal. He denied pain, weakness,

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paraesthesia, or visual symptoms suggestive of neurological disease.

Neurological examination demonstrated normal gait, muscle tone, strength, reflexes, and sensory function, including intact sacral reflexes. Urological examination including digital rectal examination was normal. Cystoscopy revealed a normal urethra and bladder mucosa without evidence of obstruction.

Urodynamic testing showed preserved bladder sensation with first sensation at 200 mL and strong desire to void at 490 mL. However, no detrusor contraction occurred during attempted voiding, consistent with detrusor acontractility (Fig. 1).

Pelvic MRI demonstrated normal pelvic anatomy without bladder outlet obstruction. MRI of the brain and spinal cord revealed no abnormalities. Electromyography of the anal sphincter and bulbocavernosus muscles showed normal tonic, reflex, and voluntary activity.

Further history revealed significant recreational cannabis use, with a marked increase in consumption during the weeks preceding symptom onset. In the absence of alternative etiologies, cannabis exposure was considered the most likely contributing factor.

Clean intermittent self-catheterization was recommended but declined by the patient. An indwelling catheter with a valve system was therefore used for bladder drainage. Complete abstinence from cannabis was strongly advised. No other medical procedures were performed, no medications were initiated or modified, and no additional lifestyle changes occurred during this period.

At four-month follow-up, with complete abstinence from cannabis, bladder function had fully recovered with restoration of spontaneous voiding and normal detrusor activity.

3. Discussion

Cannabinoids exert their biological effects through activation of the cannabinoid CB1 and CB2 receptors. These receptors are widely distributed in the lower urinary tract, including the urothelium, afferent nerve fibers, and detrusor muscle. Experimental studies suggest that activation of cannabinoid receptors can modulate neurotransmitter release, influence ion channel activity, and suppress sensory afferent signalling, thereby altering bladder sensation and contractility.[3,4]

The endocannabinoid system has been investigated as a potential therapeutic target in patients with lower urinary tract dysfunction. In particular, cannabinoid-based therapies have shown potential benefits in patients with neurogenic detrusor overactivity, especially in individuals with multiple sclerosis, where reductions in urgency, frequency, and incontinence episodes have been reported.[9] Cannabinoids exert their effects primarily through activation of cannabinoid receptors CB1 and CB2 expressed in urothelial cells, detrusor muscle and nerve fibres; however, in addition to CB1/CB2 receptor activation, cannabinoids can exert their influence on ion channels involved in neural excitability and neurotransmission[10]. In the bladder, cannabinoids are therefore thought to regulate the activity of sensory neurons involved in urine storage and micturition[11]. Their effects on bladder function appear to be complex, involving modulation of sensory afferent signalling, neurotransmitter release, and detrusor contractility, with an overall tendency toward downregulation of bladder sensory function. However, these inhibitory actions on neural transmission and detrusor activity may, in certain individuals, theoretically predispose to impaired bladder emptying. Although such mechanisms have been suggested in experimental studies, clinical evidence directly linking cannabis use to urinary retention remains limited[12].

In the present case, the close temporal relationship between the patient's markedly increased cannabis use and the onset of urinary retention – together with an otherwise normal neurological and urological evaluation (Table 1), the absence of identifiable alternative etiologies, and full recovery after sustained abstinence – suggests a possible

Table 1
Investigations performed and the results.

Investigation	Result
Neurological examination	Normal
Digital rectal examination	Normal
Cystoscopy	Normal urethra and bladder
Urodynamics	Preserved sensation, absent detrusor contraction
Pelvic MRI	No bladder outlet obstruction
Brain and spinal MRI	Normal
EMG sphincter/bulbocavernosus	Normal

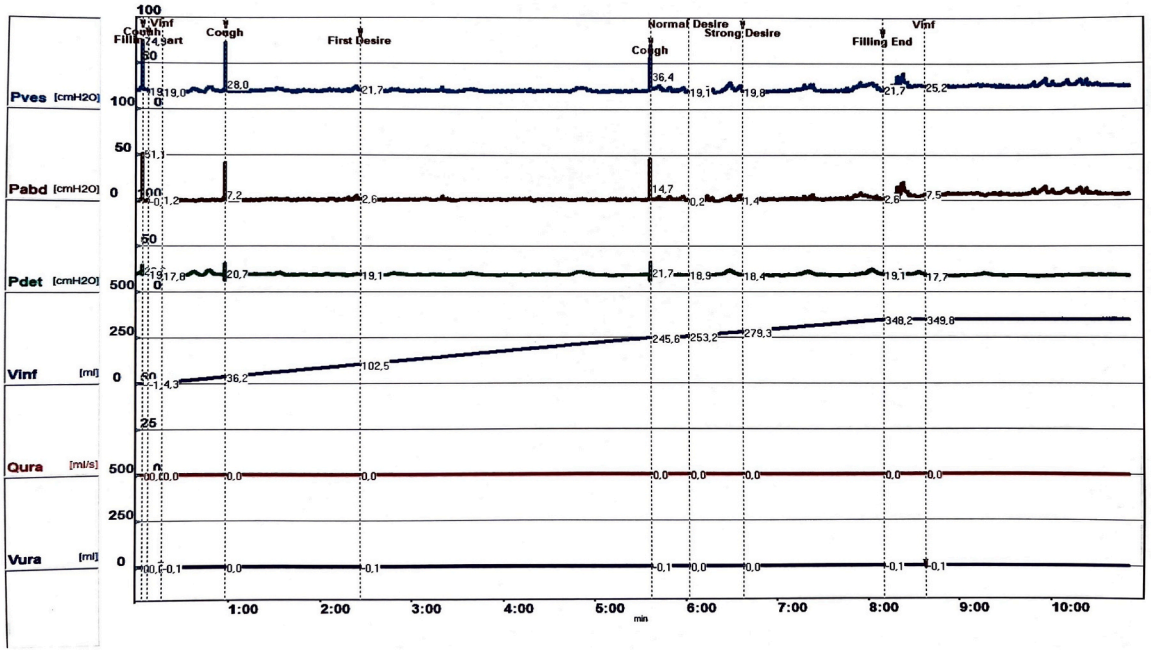

Fig. 1. Urodynamic study demonstrating preserved bladder sensation with absent detrusor contraction during attempted voiding, consistent with detrusor acontractility. During bladder filling at 50 mL/min, first sensation occurred at 200 mL and strong desire to void at 490 mL. Despite adequate bladder filling sensation, no detrusor contraction was observed during the voiding phase, and bladder emptying required catheterization.

causal association. Nevertheless, a definitive causal link cannot be established based on a single case.

With the global increase in cannabis consumption, clinicians may encounter similar cases more frequently. Awareness of cannabis as a potential contributor to bladder dysfunction may therefore be clinically relevant, particularly in young patients presenting with unexplained urinary retention.

4. Conclusion

This case highlights cannabis use as a possible reversible cause of acute urinary retention. Clinicians should consider cannabis exposure in young patients presenting with unexplained urinary retention when routine diagnostic evaluation is normal.

CRediT authorship contribution statement

Melita Rotar: Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Simon Hawlina:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization.

Patient consent

Written informed consent for publication was obtained from the patient.

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Declaration of competing interest

Melita Rotar: Medtronic - advisor.
Simon Hawlina: no conflicts of interest.

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