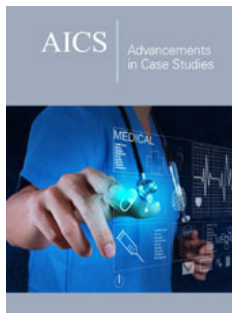


# Pneumatosis in Neobladder Due to Complete Urinary Retention: Case-Report

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## Abstract

An 84-year-old vasculopathic male presented to the emergency room with complete urinary retention in neobladder performed 15 years before. Abdominal tomography scans showed overdistension of the neobladder and the peculiar finding of pneumatosis. A bladder catheter was placed and the patient became and remained asymptomatic with progressive disappearance of pneumatosis. The evident causal role of urinary retention in the case of neobladder pneumatosis here suggests that urinary retention should also be considered among the possible causes of bladder pneumatosis.

**Keywords:** Pneumatosis; Neobladder; Overdistension; Urinary retention

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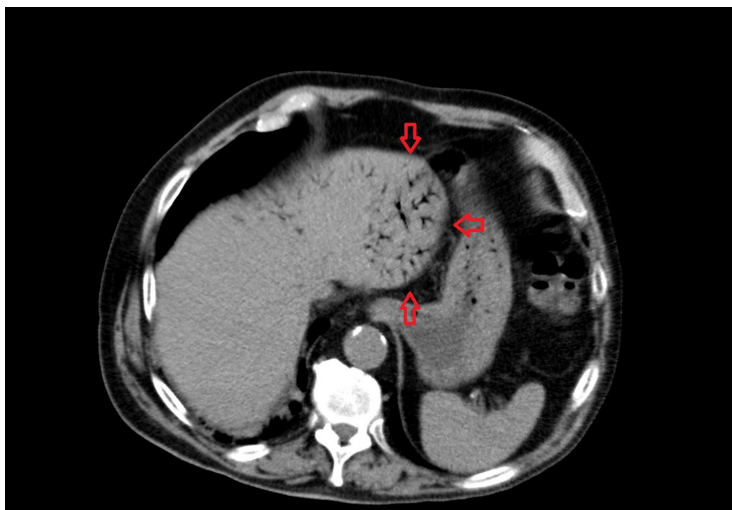
## Introduction

Air within the bladder wall, or bladder pneumatosis (BP), is a rare finding most often resulting from an infectious etiology, as in emphysematous cystitis. However, reports of BP occurring without clear infectious origins are compared in the literature. The pathogenesis of air within the bladder wall in these cases remains poorly understood but a process similar to pneumatosis intestinalis has been proposed. We present the unusual case of a male in whom pneumatosis involved the neobladder. Verisimilarly the pneumatosis was due to ischaemia of the neobladder wall secondary to urinary overdistension.

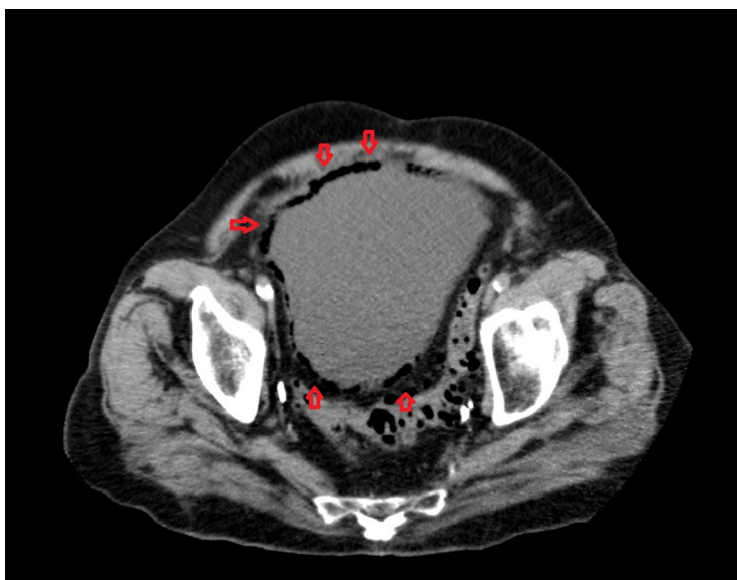
## Case Presentation

An 84-year-old male presented to the emergency room with pain in the lower abdominal quadrants, nausea, vomiting and general distress. The abdomen was painful on palpation with negative Blumberg sign. He was a vasculopathic patient with a history of coronary revascularization procedures, as well as interventions on the carotid arteries and iliac-femoral axes. 15 years earlier he had undergone radical cystectomy and orthotopic ileal neobladder formation according to Studer for bladder neoplasm *in situ*. Afterwards, he no longer underwent urological check-ups.

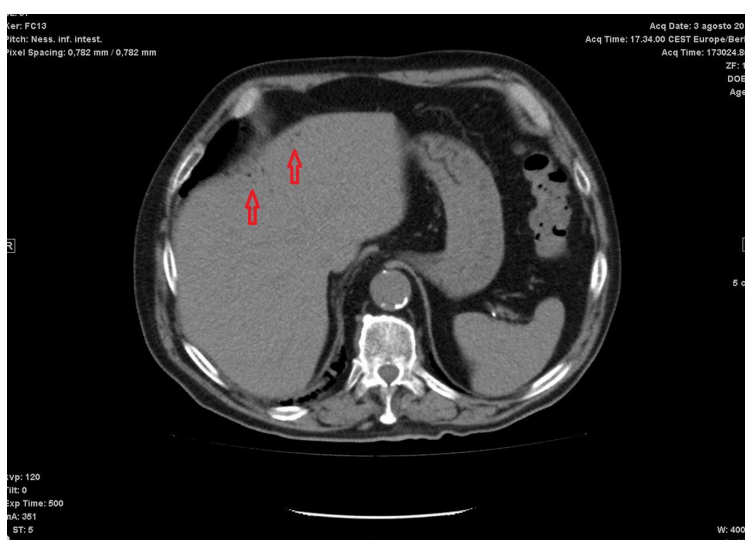
A non-contrast abdominal computed tomography scan (CT) showed aerobilia and overdistension of the neobladder with numerous gas bubbles arranged along the entire wall (Figures 1 & 2). A bladder catheter was placed with evacuation of 1000cc of clear urine with quick and marked improvement in pain. The subsequent CT urography, performed after a few hours, confirmed the pneumatosis of the neobladder wall and the disappearance of gaseous aspects in the liver parenchyma (Figure 3).



**Figure 1:** Aerobilia detected on direct CT scan performed at the onset of symptomatology.



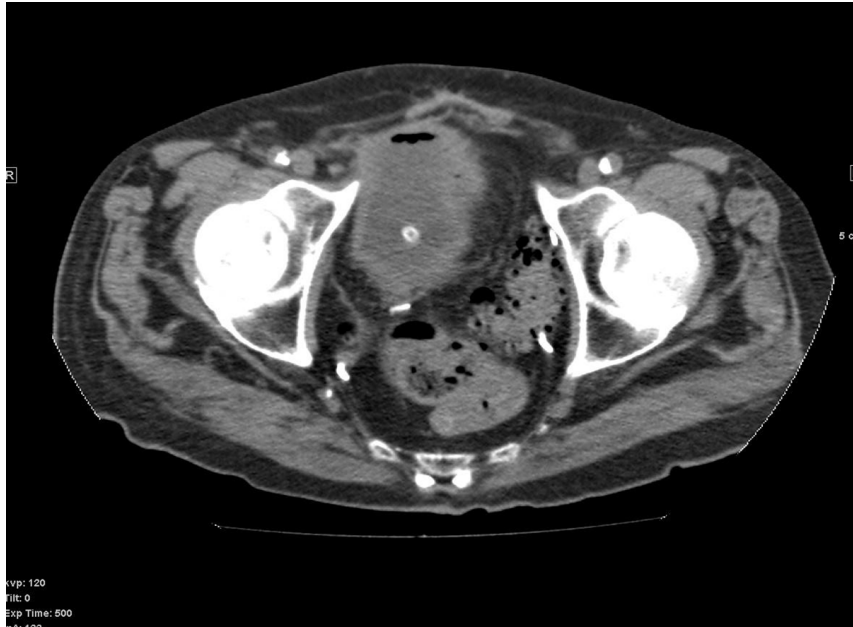
**Figure 2:** Pneumatosis of the neobladder detected on direct CT scan at the onset of symptomatology.



**Figure 3:** Disappearance of aerobilia at CT urography performed after a few hours.

The patient became and remained asymptomatic with the indwelling catheter. Two months later he underwent aortic CT angiography, which revealed stenotic visceral vessels, especially the superior mesenteric and the right renal arteries while reduced pneumatosis persisted along the walls of the neobladder. Fifteen

days later he underwent percutaneous angioplasty of the superior mesenteric artery and coeliac tripod with stent implantation and restoration of good vascular patency. After 3 months the abdominal CT showed the complete disappearance of neobladder pneumatosis (Figure 4).



**Figure 4:** CT scan at 3 months: disappearance of pneumatosis of the neobladder.

## Discussion

The presence of gas within the wall of the bladder, or bladder pneumatosis (BP), can depend on an infection as in emphysematous cystitis, a rare form of urinary infection at increased risk of occurrence in older female subjects with diabetes mellitus [1,2]. Actually, BP can also be considered a sign of bladder distress and can recognise other causes than emphysematous cystitis, as demonstrated in some case reports [3-6].

In our peculiar case, pneumatosis involved an ileal neobladder in a vasculopathic subject, so the cause of the pneumatosis was primarily assumed to be the stenosis of the nourishing artery, the superior mesenteric. Instead, the trigger for the ischaemia of the neobladder, and the consequent pneumatosis, has been the overdistension of the neobladder due to complete urinary retention. In fact, the repositioning of the urethral catheter rapidly resolved the painful symptoms and led to the disappearance of the aerobilia similarly to what was described in another case-report of pneumatosis concerning a neobladder [7].

As the intestine does not have an active contraction ability, emptying of the neobladder requires abdominal straining and sphincter relaxation. Therefore, neobladder is prone to complications, including chronic urine retention that affects 6% to 22% of males [8]. Probably our patient, who had escaped urological follow-up for many years, was suffering from chronic incomplete retention of urine which became complete causing overdistension of the neobladder.

It is common knowledge that high intraluminal pressure in bladder induces adaptive changes in the bladder structure, which, in the long term can result in decrease of bladder compliance and impaired perfusion [9]. In our case is conceivable that the complete urinary retention caused high intraluminal pressure in the neobladder and subsequent ischaemia of the thin ileal walls resulting in pneumatosis of the neobladder. Obviously, ischaemia of neobladder occurred more easily and more severely because this patient was a vasculopathic subject with stenosis of the superior mesenteric artery. Nevertheless, the clinical course suggests that urinary retention was the trigger for the neobladder ischaemia and subsequent pneumatosis.

## Conclusion

Neobladder pneumatosis is an exceptional finding and in the case described was caused by ischaemic damage triggered by the complete retention of urine. We suggest considering the role of urinary retention among the possible causes of bladder pneumatosis.

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