Annals of Case Reports & Reviews

Case Report

doi: 10.39127/2574-5747/ACRR:1000313

Ng A and Jones J. Annal Cas Rep Rev: ACRR-313

# Haematoma Formation Secondary to Intravesical Botulinum Toxin an Injection: A Rare Complication

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**Citation:** Ng A and Jones J (2022) Haematoma Formation Secondary to Intravesical Botulinum Toxin an Injection: A Rare Complication. Annal Cas Rep Rev: ACRR-313.

**Received Date:** March 21st, 2022; **Accepted Date:** March 28th, 2022; **Published Date:** April 04th, 2022

***Abstract***

*Intravesical injection of botulinum toxin A is a well-recognised management of patients experiencing detrusor overactivity. Common complications include haematuria, urinary tract infection and urinary retention.*
*Our case looks at a 48-year-old gentleman presenting with acute abdominal pain and left groin bruising several hours after intravesical injection of botulinum toxin A under local anaesthetic. He underwent CT scanning which reported the presence of a large haematoma within the retropubic space. The case highlights the importance of thorough investigation in patients presenting with unusual symptoms post-operatively and a rare complication of botulinum injections to the bladder.*

***Keywords:*** *Intravesical; Botulinum toxin A; Haematoma.*

## Case

Patient M is a 48-year-old male with multiple sclerosis diagnosed in 2002. He currently mobilises with a wheelchair. He was initially referred to Urology in 2013 with storage lower urinary tract symptoms, incomplete bladder emptying and poor flow. Uroflowmetry revealed a maximum flow rate of 12.3ml/secs on a voided volume of 300m, leaving a 27ml residual. Cystoscopy was normal. He was commenced on anticholinergic pharmacotherapy which initially managed his symptoms however Patient M discontinued this in 2018.

Patient M's urodynamic studies demonstrated detrusor overactivity with equivocal pressures on voiding. He agreed to intravesical Onabotulinum toxin A (200i/u) injections using flexible cystoscopy under local anaesthesia in January 2019. The benefits were short lived, and he had two further 200i/u injections in March and September 2019. The Onabotulinum toxin A dose was increased to 300i/u in January 2020 with improved therapeutic effect.

His most recent local anaesthetic procedure was in July 2020. 300i/u of Onabotulinum toxin A was diluted with 0.9% Sodium Chloride to create a dilution of 10i/u per mL. This was injected in x30 1mL increments throughout the bladder, sparing the trigone, using an InjeTAK needle set at a length of 3mm. Patient M was discharged on the same day.

The following day the patient represented with abdominal pain. On examination he had a tender mass lateral to his umbilicus with bruising in his left groin. There were no signs of skin breakage or infection. He did not complain of urinary symptoms, haematuria nor any symptoms suggesting an allergic reaction. Bloods results are shown in Table 1.

| | |
|---|---|
| Full Blood Count | Haemoglobin: 116<br>White Cell Count: 8.2<br>Platelets: 195 |
| Coagulation Screen | Prothrombin time: 10 seconds<br>APTT: 24 seconds<br>Fibrinogen: 3.78 g/L |
| CRP | 30 |

**Table 1**: Patient M's bloods day 1 post procedure

He had a Computed Tomography (CT) abdomen and pelvis which demonstrated an elliptical mass lesion with mild homogenous uniform enhancement, noted anterior to the bladder and posterior to the abdominal wall separated from it by fat planes. This measured 11x10x9 cm in craniocaudal x transverse x anteroposterior dimensions. The CT images are demonstrated in figures 1a and b. The patient was managed conservatively and reviewed in the outpatient clinic 2 months later with complete resolution of his bruising and pain.

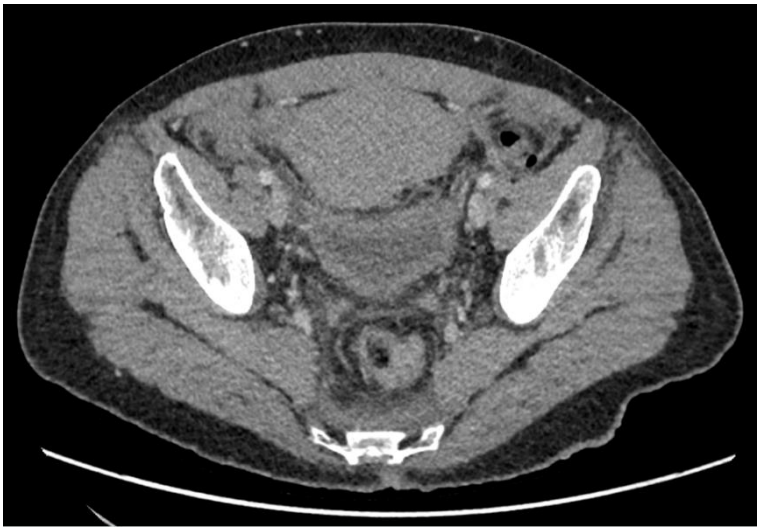

**Figure 1a:** Coronal views of CT abdomen and pelvis demonstrating haematoma anterior to bladder wall and posterior to abdominal wall [arrowed]. This measured 11x10x9 cm in craniocaudal x transverse x anteroposterior dimensions.

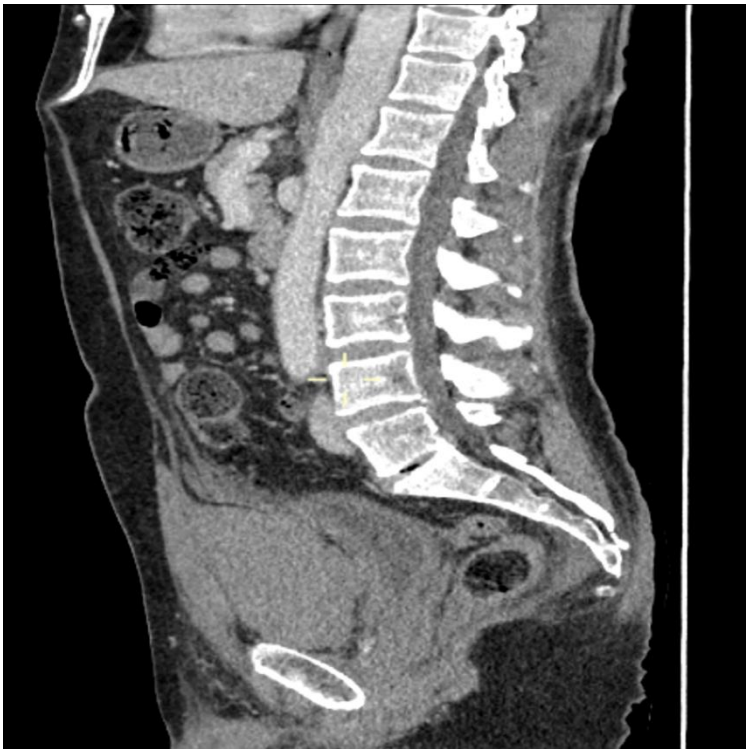

**Figure 1b**: Sagittal views of CT abdomen and pelvis demonstrating haematoma anterior to bladder wall and posterior to abdominal wall [arrowed].

## Discussion

Botulinum toxin is produced by the gram-positive anaerobic bacteria Clostridium Botulinum of which there are seven subtypes (A-F). Within urology there is widespread use for the management of detrusor overactivity (DO), typically when anticholinergics or beta-3 agonists have failed to improve symptoms. Multiple Sclerosis (MS) is a demyelinating neurological condition whereby 10% of patients will present with voiding dysfunction at the time of disease onset and 75% of patients develop this after 10 years of onset.[1] DO is a frequent urodynamic finding in MS patients and multiple randomised controlled trials and meta-analyses demonstrates that intravesical botulinum toxin A is an effective intravesical treatment in the management of neuropathic DO refractory to oral therapies.[1-3]

Complications of intravesical botulinum toxin A injections have been highlighted in the literature and by the British Association of Urological Surgeons and these include dysuria, haematuria, urinary retention, infection and allergy to botulinum toxin A.[4,5] There are no reports documenting haematoma formation secondary to intravesical injections.

A possible source of patient M's haematoma could be the intravesical needle disrupting a superficial vein within the perivesical plexus. In the literature there are documented cases of iatrogenic retropubic haematoma formation secondary procedures such as minimally invasive retropubic mid-urethral sling insertion (MUS) and are an established risk of more invasive pelvic stress urinary incontinence procedures such as burch colposuspension or autologous facial sling insertion. Haematoma formation is reported in 0.9-8% of MUS procedures and this is due to damaging a vessel on trocar insertion.[5] Management of small haematomas (<8cm in diameter) or <250ml require no surgical intervention whilst larger haematomas and/or patient showing a significant drop in haemoglobin of >4 g/dl and/or clinical instability should have acute intervention such as embolization or open haematoma evacuation. [5]

Despite Patient M having a haematoma size of > 8cm, he was haemodynamically stable and throughout a period of observation he showed no signs of infection or worsening symptoms, and his bruising gradually resolved. The haematoma location suggests that the needle was injected at the anterior aspect or the bladder dome. The injeTAK is a 23-gauge needle which has an adjustable tip length ranging from 0, 2, 3, 4, and 5mm to accommodate bladder wall thickness. The injeTAK recommends 2mm to be used in the dome of the bladder and 3-5mm needle depth for the remainder of the bladder.[6] In patient M's case the needle length was 3mm when injecting throughout the bladder, sparing the trigone. Regarding clinical effectiveness, there are several studies which show that both sub-urothelial and detrusor muscle level injections both provide therapeutic benefit from botulinum toxin A.[7,8] Previously there were concerns of a hypothetical risk of reflux from injecting the trigone of the bladder, however there has been no clinical evidence in modern studies confirm this.[8]

Karsenty et al[10] compared 22 studies on intravesical injection techniques and although different needles were not directly compared, the overall accepted needle length was 4mm with no mention of adjusting to size according to injection site perioperatively. Karsenty et al concluded key features for cystoscopic needles to be suitable for intravesical injection (Table 2). There is little in the literature comparing needle length, injection site and its correlation to complications. The injeTAK needle was not included in Karsenty et al's paper but there has been a study to suggest that the choice of variable needle length can prevent complications such as bladder perforation[10] however, given the small sample size further larger studies are needed.

| Key properties of cystoscopic needles |
|---|
| • Avoids the risk of leakage or perforation of the bladder wall<br>• Ensure targeted injection<br>• Cost-effective<br>• Sharp enough to penetrate<br>• Avoid bleeding<br>• Low risk of injection pain<br>• Does not damage the cystoscope<br>• Flexibility of shaft to allow good tactile feel<br>• Good quality of connection with syringe (luer lock) |

**Table 2:** Features of the ideal cystoscopic needle. Adapted from Karsenty et al[9]

## Conclusions

Haematoma formation secondary to intravesical injection is a rare complication which is not currently documented within the literature. Despite its rarity, the needle length and bladder wall thickness should always be considered intraoperatively to prevent such complications. Early recognition of potential post-operative complications such as acute abdominal pain, haemodynamic compromise and unusual bruising should trigger prompt investigation. Management of even large haematomas can be done successfully with a conservative approach in systemically well, haemodynamically stable patients as we report, although some may require drainage or evacuation depending on the patient's clinical status.

**Acknowledgements:** Nil

**Conflict of interest:** None declared

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