CASE STUDIES

A case series of a novel phenomenon of "whiplash bladder"

Francis Chinegwundoh*[1,2], Esther Oluseyi Bamigboye[3]

[1] Royal London Hospital, Barts Health NHS Trust, Whitechapel, London, United Kingdom
[2] School of Health Sciences, City, University of London, United Kingdom
[3] Torbay Hospital, Torbay and South Devon NHS Foundation Trust, United Kingdom

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ABSTRACT

We describe the phenomenon of the development of lower urinary tract symptoms (storage) following accidents in which there is no direct bladder trauma or pelvic fracture and propose the term "Whiplash bladder". That bladder symptoms may develop in such circumstances is under appreciated in the urological and medical legal literature.

Key Words: Bladder dysfunction, Lower urinary tract symptoms, Trauma, Pelvic nerves, Whiplash

1. INTRODUCTION

It has been observed by the corresponding author in his medical legal practice that following road traffic accidents (RTAs) and minor accidents, in which there is no pelvic fracture, a subset of patients develop new onset (or worsening of pre-existing) Lower Urinary Tract Symptoms (LUTS), indicative of an overactive bladder.

LUTS is a group of storage symptoms and voiding symptoms. Filling symptoms include an urgent need to pass urine, increased frequency of urination, needing to urinate at night and leaking urine before arriving at a toilet (urge incontinence). Voiding urinary symptoms include having a reduced flow of urine even with straining, intermittent flow of urine, difficulty in initiating urination, and a need to strain to complete voiding (see Table 1). It has been established that LUTS are caused by diseases affecting the urinary system, adjacent pelvic organs, and, in a small number of cases, neurological pathology affecting the nerves that sub serve the bladder.[1]

A new onset or worsening of LUTS has been noted predominantly in women who have been involved in RTAs and minor accidents, but also in men. There is currently little recognition of this association; thus there are medico-legal ramifications that are not currently being appreciated during the handling of these cases.

The issue of raising awareness of and recognising this association is therefore important in the education of medical professionals and the legal system so as to adequately handle patient cases. In this report we will present 5 cases, that the corresponding author has encountered, that illustrate this newly described phenomenon we propose to call "Whiplash bladder".

*Correspondence: Francis Chinegwundoh; Email: Frank.Chinegwundoh@nhs.net; Address: Department of Urology, Royal London Hospital, Whitechapel Road, London E1 1FR, United Kingdom.

Table 1. List of storage and voiding symptoms of LUTs

Storage symptoms	Voiding symptoms
Increased frequency of urination	Reduced stream which is unimproved by straining
Urgency – increased desire to urinate	Hesitancy – difficulty initiating a stream of urine
Urge incontinence – extreme desire to urinate, with some occurrence of leakage before finding a toilet	Incomplete voiding – a need to strain for complete voiding
Nocturia – passing urine at night	Terminal dribbling of urine

2. CASES

2.1 Case 1

A 45 years old female presented to secondary care with symptoms of urge incontinence, urgency, and frequent voiding shortly after an RTA in which she was stationary at a traffic light, wearing a seatbelt, when her car suffered a rear shunt. These symptoms were not present before the RTA and remained present even 3 years after the initial RTA, despite medication.

Urodynamics testing revealed detrusor overactivity; this confirmed the diagnosis of severely overactive bladder. To rule out other possible causes of her symptoms, such as infection, inflammation or obstruction of the urinary tract, the patient underwent a flexible cystoscopy (visual inspection of the inside of the bladder), and an ultrasound scan.

The flexible cystoscopy was unremarkable. The ultrasound revealed normal kidneys and no presence of stones, swelling or scarring to explain her symptoms.

The patient is currently being managed at a specialist unit.

2.2 Case 2

A 27 years old female was involved in an accident in which a vehicle reversed into the stationary car in which she was a passenger; she was wearing a seatbelt. The impact caused her to jolt forward and then back. Upon exiting the vehicle, she experienced a sudden strong urge to urinate. Throughout the rest of the evening she experienced extreme urinary urgency and reported having to pass urine every half an hour. Before the accident, she had the ability to hold onto her urine and to delay voiding.

In the eight months that followed, her frequency improved to having to pass urine every two to three hours, which was normal for her. However, the urgency did not improve but there was no urge incontinence. The urgency led to "toilet mapping behaviour". She saw a physiotherapist who taught her how to contract her pelvic floor muscles to counteract the urgency sensation. However the patient has not persisted due to lack of perceived efficacy She has eschewed medication.

A day after the accident she complained of new mid-low back pain, which persists, and recurrent flu-like symptoms. These were not present before the accident.

2.3 Case 3

A 39 years old female was a front seat passenger wearing a seatbelt in a car collision with a lamppost at 40 miles per hour. The driver tried to pull the patient out of the vehicle against advice by passers-by. The patient cannot recall the accident; she simply remembers waking up in the hospital after the incident. Her account is from witnesses.

X-rays identified rib fractures but no pelvic fracture. The day after the accident, the patient experienced urinary urge incontinence with sudden effusive flow of urine without warning; this necessitated the use of pads which the patient remains dependent on three and a half years after the accident.

She had a background history of mild stress urinary incontinence, urge incontinence, and a small cystocele after the birth of her fourth child. This however amounted to a small amount of urine leakage which did not require the use of pads. She did state that her symptoms were manageable before the RTA but afterwards her urgency and urge incontinence were markedly worse.

After the RTA her GP noted hourly voiding and severe urge

incontinence. Examination revealed a rectal prolapse. She also experienced leakage of urine during sexual intercourse- "coital incontinence".

Cystitis and urinary tract infections were excluded. Standard urodynamics confirmed detrusor overactivity in addition to stress urinary incontinence. She underwent tension-free vaginal tape (TVT) surgery within a year of the RTA for her stress incontinence. After her surgery she reported that her urinary flow was slower; she still had urge incontinence and frequency. Her use of pads decreased from 10 pads a day to 3 a day after the surgery.

2.4 Case 4

A 36 years old female was involved in an accident at work in which she fell 1.6 metres to the ground whilst traversing a desktop. She struck her head and right side causing injury.

On examination in the hospital she was tender over the cervical spine, right greater trochanter, right abdomen, chest and right knee. On X-ray no hip fracture was identified and CT abdomen was unremarkable. An MRI within 4 months of the incident was unremarkable except for minor degenerative changes in the cervical spine, with no cord or root compromise, and the L4/L5 spinal level but this level did not correspond to her urinary symptoms; no evidence of cauda equina syndrome (spinal nerves injury) was noted.

The patient experienced new onset urinary incontinence following the accident which was not brought on by coughing, sneezing or laughing. In the months following the accident the patient reported occasional urgency in the presence of running water. The patient had begun to wear 2 pads a day in the months following the accident and in this time a further examination highlighted reduced sensation in the S2 to S4 nerve distribution down her right side. A CT scan of the abdomen and pelvis showed no obvious pathology. The patient's incontinence improved only slightly with pelvic floor physiotherapy.

The patient was diagnosed with at least five urinary tract infections (UTI) in the nine months following the accident. She would experience discomfort whilst urinating (dysuria), fever and malaise, and would be diagnosed with a UTI based on urinalysis positive for white blood cells. These symptoms would be repeated. It is important to note however that four urine samples sent for analysis tested below the usual amount of bacteria that would confirm a UTI. The patient was prescribed prophylactic low dose Nitrofurantoin which resolved the UTI symptoms. There were instances of coital incontinence and nocturia which seemed to resolve with Mirabegron (a drug to counteract the overactive bladder). Despite similar fluid intake to before the accident, the patient had symptoms of increased frequency having to urinate 5-7 times a day.

The patient also suffered temporomandibular dysfunction and back pain as a result of the accident. In conclusion, over three years after her accident at work the patient still experienced urge incontinence, coital incontinence and frequency.

2.5 Case 5

A 50 years old man was a front seat passenger in a vehicle which was rear-shunted on a motorway at approximately 70 mph. He suffered musculoskeletal injuries to his neck and back, treated by analgesia. Two years prior, he experienced voiding symptoms attributed to benign prostate hyperplasia. No treatment was required. Within two weeks of the accident he complained of urgency, frequency and urge incontinence. Standard urodynamics at his local urology unit confirmed detrusor overactivity and mild obstruction. The storage symptoms responded to the anticholinergic agent solifenacin 10mg daily. Two years later repeat urodynamics, for worsening voiding symptoms, demonstrated significant obstruction. No detrusor overactivity was seen, probably due to the patient not having stopped solifenacin for the test. A flexible cystoscopy showed an occlusive, enlarged prostate. Surgery by way of transurethral resection of prostate led to resolution of voiding symptoms and enabled cessation of solifenacin. Two years on the storage symptoms remain quiescent.

3. DISCUSSION

Overactive bladder (OAB), according to the International Continence Society, can be defined as "urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence, in the absence of urinary tract infection (UTI) or other obvious pathology".[2] Urodynamics testing measures the ability of the bladder and the urethra to store and release urine; sterile fluid is passed into the bladder and the pressure changes or contractions of the bladder are measured under a number of circumstances, for example coughing. It is used to diagnose OAB.[3]

The patients described in the reports experienced new onset or worsening symptoms ranging from urge incontinence, urgency, frequent voiding and coital incontinence after a RTA; a recurring theme in these cases is that there was no obvious pathology of injury, such as direct trauma to the bladder, that could be confirmed by imaging. Thus the exact mechanism

of injury remains unknown.

We would like to postulate that due to the similar modes of injury in each case that at some point involved a rapid jolting movement, the pathology may be due to abrupt stretching or shearing trauma to the nerves that sub serve the bladder. It is known that compression, infection, irritation and other trauma of the nerves that supply the bladder can cause bladder dysfunction and overactive bladder symptoms.[4] The control of the storage of urine and micturition is a combination of neural pathways and anatomical structure and disruption of either of these can result in OAB. It is thought that the bladder has a limited range of responses to insult at any point in the control chain of micturition thus injury at a myriad of the different points may result in the same symptoms.

We would like to propose the umbrella term "Whiplash Bladder" to describe new onset or worsening of overactive bladder symptoms which begin after a RTA, or other jolting accident where no other obvious cause is present.

It is important to note that as this small study was retrospective; there was no way to control for similarity of investigation. For example, in case 1 no MRI was performed as the mode of injury did not necessitate this. In case 2 no urodynamic study was performed as the diagnosis of overactive bladder was a clinical one; an MRI was also not indicated for the mode of injury. The concept of whiplash bladder is up until now not yet recognised. In the future, the presence of detrusor overactivity on urodynamic studies and a negative (for spinal cord damage) MRI could form a gold standard measure for the diagnosis, where there is a positive history for a shunting injury. It is also important to note that the diagnosis of overactive bladder can be a clinical diagnosis.

Currently the management for whiplash bladder in the cases is based on symptom control as for idiopathic overactive bladder as there are no abnormal findings on imaging. The major focus for now is the identification of affected patients to ensure that their medical and legal cases are handled appropriately. The authors were unable to find recognition of such bladder dysfunction occurring after non-penetrating trauma in the current literature.

4. Conclusion

We propose that a new onset of lower urinary tract symptoms, particularly storage symptoms, due to detrusor overactivity is a real entity that can occur after a shunting incident or fall. This is under-recognised in medical/medical legal literature. The acknowledgement of "Whiplash Bladder" has medico legal ramifications for all parties involved in RTA s and falls.

Learning points

- Definition of "Whiplash bladder" as new onset overactive bladder symptoms associated with a recent RTA or minor jolting accident and no pelvic fractures
- The need to recognise Whiplash bladder in patients after RTAs and minor accidents

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Consent to publish

We have the patients' consent to publish their cases.

Declarations

This information reported in this article is available on request.

Ethics, consent and permissions

Not applicable.

Conflicts of Interest Disclosure

The authors declare they have no conflicts of interest.

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