

CASE REPORT

BENTHAM
SCIENCE

Wallet Neuritis – An Example of Peripheral Sensitization

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Abstract: Background: Wallet neuritis is an example of extra-spinal tunnel neuropathy concerning sciatic nerve. Its clinical appearance often gets confused with sciatica of lumbar spine origin. Wallet-induced chronic sciatic nerve constriction produces gluteal and ipsilateral lower extremity pain, tingling, and burning sensation. It was Lutz, first describing credit-card wallet sciatica in an Attorney, surfaced on Journal of American Medical Association (JAMA), 1978; however, the condition has not been well-studied in various other occupations.

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Case Summary: In this write-up, we take the privilege of demonstrating wallet neuritis as an example of peripheral sensitization in three different professionals' namely specialist doctor, driver, and banker first time in Bangladesh. All the three patients' demonstrated aggravated gluteal pain with radiation on the homo-lateral lower extremity while remained seated on heavy wallet for a while, fortunately improved discontinuing such stuff with. Alongside radical wallectomy, piriformis stretching exercise on the affected side had also been recommended and found worthy in terms of pain relief.

Conclusion: long-standing use of rear pocket wallet may compress and sensitize ipsilateral sciatic nerve, generating features resembling lumbago sciatica; thereby, remains a source of patients' misery and diagnostic illusion for pain physicians as well.

Keywords: Wallet neuritis, occupation, peripheral sensitization, long-standing, lower extremity pain, repetitive compression.

1. INTRODUCTION

Wallet neuritis or fat wallet syndrome, a compressive tunnel neuropathy, where ipsilateral sciatic nerve gets compressed from exogenous wallet beneath piriformis muscle, proliferating clinical features mimicking lumbago sciatica [1]. While using a thick wallet, posture of pelvis, dorso-lumbar spine gets compromised, mounting pressure on pelvic muscles, inter-vertebral discs, nerve roots, and nerves unevenly [2]. Most importantly, the scenario is not that much scarce as we would reckon before [3]. Its prevalence has not been estimated yet either in general population or in any particular ethnic group, occupation. We even do not know whether any relationship prevails between wallet texture and wallet neuritis clinical presentations.

In some publications including medical periodicals, fat wallet syndrome has been stated as an entity of piriformis syndrome (PS), though its existence also documented without PS features [1, 4]. Long-standing fatty wallet sitting exposes piriformis muscle and sciatic nerve vicinity under overwhelming stretch, generating ipsilateral low back ache

and radiating lower extremity pain of twinge character; henceforth the condition sometimes termed as back pocket sciatica [1]. In New England Journal of Medicine, 1966, through a letter to editor, Battle first coined the term "credit-carditis" to describe wallet sciatica in a lawyer; nevertheless the condition got popularized by Seinfeld (wallet) television series in the 1990's [3, 4]. Later, Lutz first demonstrated two cases of credit-card-wallet sciatica that was published in Journal of American Medical Association (JAMA), 1978. As per Lutz, even '28 mm × 37 mm' sized wallet was enough for generating wallet neuritis features [1].

But, how rear pocket wallet perpetuates sciatic neuritis? In a review, Boyajian-O'Neill *et al.* stated that wallet-induced repetitive compression of the underneath sciatic nerve might get responsible propagating wallet sciatica manifestations [5]. In addition, sciatic nerve compression expressing Nav1.8 channels and *c-fos* gene had been reported to be associated with its sensitization in animal models, though yet to establish on human model trial [6, 7].

Published original contributions except a few case report/case series on wallet sciatica are scarce. The clinical entity has never been demonstrated in Bangladeshi community alike in many developed and developing countries as well. So, we take the initiative of describing the clinical en-

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tivity among different professionals with a view to make aware both patients and physicians and to avoid misunderstanding it with other clinical mimickers mostly of spine origin. The study was performed in accordance with the Declaration of Helsinki.

2. CASE SERIES

2.1. Case-1

A 37-year-old specialist doctor reported with the complaint of right gluteal pain that was more with sitting longer than 30 minutes. He repeatedly stressed that long-standing use of back pocket wallet might perpetuated his buttock pain. However, the pain radiated down the right lower limb mostly over the postero-lateral aspect of thigh and antero-lateral aspect of leg with associated burning sensation as well. He also reported further pain aggravation while maintained lotus posture (prolonged sitting on foot compressing the buttock) during praying. There was subjective heaviness on the same lower extremity as well. FAIR (flexion, adduction, internal rotation), Pace, and SLR (straight leg raise) maneuvers were also negative. There was hardly any gluteal tenderness on deep palpation. The patient habituated to use a '2 cm × 9 cm × 12 cm' sized wallet; and further screening revealed, that stuffed with visa card, visiting cards, scraps of paper, receipts of purchase, making it bulky enough to generate substantial pressure on the ipsilateral gluteal region. At that time his VAS (visual analogue scale for pain, 0-10 cm) score was 7. Considering all these facts a provisional diagnosis of fat wallet syndrome had been made. Screening of lumbo-sacral spine on MRI provided nothing significant changes favoring spine originated pain including inter-vertebral disc, nerve roots pathology. Nerve conduction study (NCS) of right lower limb revealed demyelinating features of both common peroneal nerve and tibial nerve (Fig. 1a and b). Henceforth, the patient asked to avoid back pocket wallet and advised piriformis stretching exercises. To be intriguing, in his second follow-up, one month later, the patient reported with significant improvement of his gluteal and ipsilateral lower extremity pain with a lower (1/10) VAS score; though

stated about some discomfort providing that he adopted long sitting amid bus journey and his professional engagement.

2.2. Case-2

A 50-year-old truck driver reported with the complaint of severe right gluteal and lower limb pain that was more while prolonged sitting and side lying. He found ambulation a bit of pain relieving. The pain radiated down the right lower limb mostly over the side/back of thigh and outer aspect of leg and foot which associated with tingling sensation as well. The patient reported that, his pain was at its worst while he was driving remaining seated on rear wallet; henceforth discontinued such stuff with eventual pain improvement. However, all on a sudden his gluteal pain hiked its peak since he adopted squatting for long-time while fitting tiles *per se* in his kitchen. Physical examination revealed, antalgic gait. Both FAIR and Pace maneuvers were also positive. Screening of lumbar spine, hip, sacroiliac, and knee joints revealed no abnormality. SLR also was negative. Initially we made a provisional diagnosis of piriformis syndrome. To screen lumbar spine pathology, lumbo-sacral spine MRI had done though without significant changes for disc protrusion, annular tear, nerve roots compression; gluteal structures screening with high frequency ultrasound (3.5 MHz) (Fig. 2) revealed thicker right piriformis muscle than its left counterpart (18 mm versus 11 mm). We initially prescribed oral etoricoxib, (120 mg/day) and pregabalin (75 mg 2 times /day) without fruitful outcome. The patient also advised to perform piriformis stretching exercise alongside. His initial VAS for pain (0-10 cm) score was 8/10 and it was 6/10 in his final follow-up. Eventually, we decided to treat his piriformis muscle with intra-lesional injection methyl-prednisolone (40 mg/ml), lidocaine (1%) (7 ml), and bupivacaine (.25%) (2 ml). Two weeks later, the patient gave us 3rd follow-up with smiley face, signifying substantial pain improvement and that time we recorded his VAS, pain score 1/10. However, the patient complained episodic ipsilateral buttock and lower extremity discomfort with pain, tingling if he adopted long-standing sitting while driving.

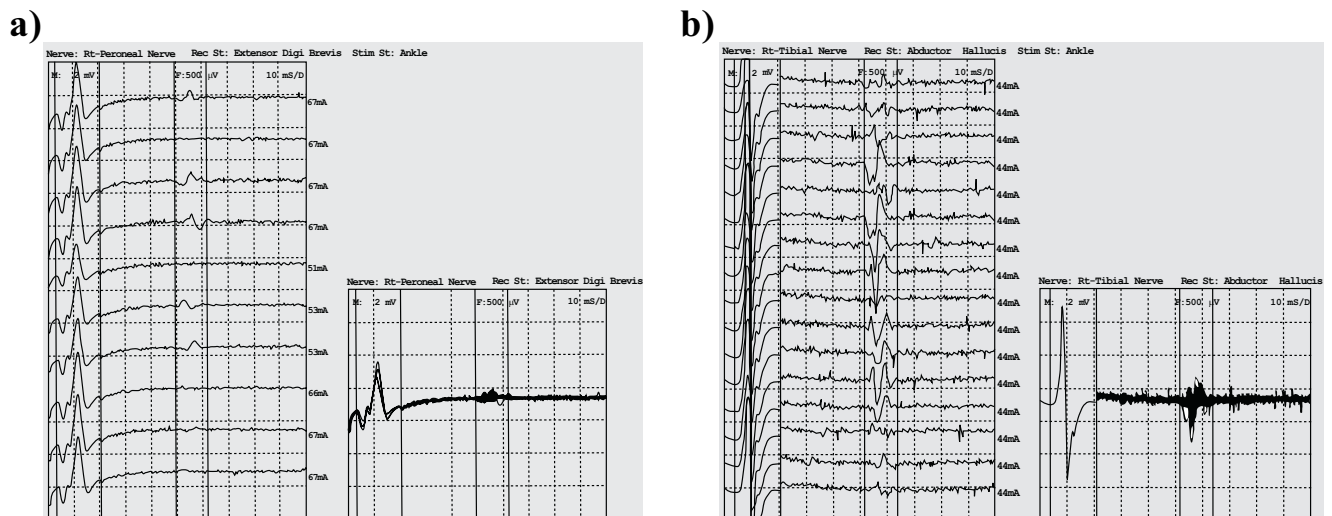


Fig. (1). Nerve conduction study (Fig. 1a and b) of right lower limb in case 1.

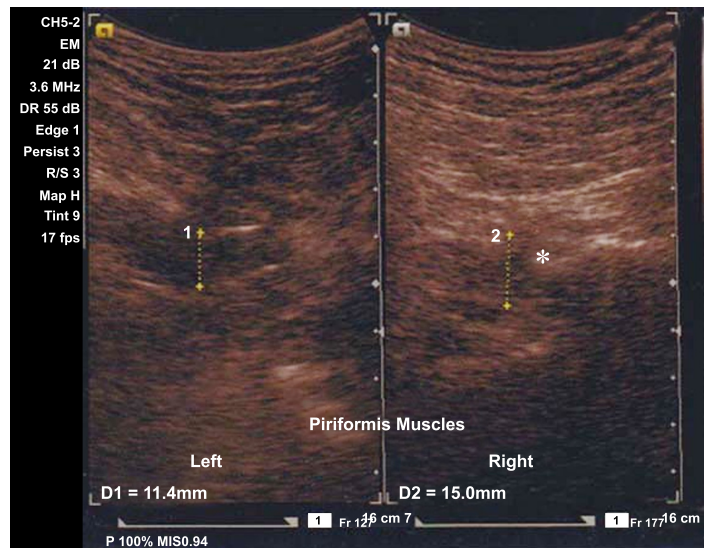


Fig. (2). Ultrasonogram of gluteal region revealing, right piriformis muscle (*) is thicker than its left counterpart in case 2.



Fig. (3). Measurement of third patient’s rear pocket wallet loaded with money, scarps.

2.3. Case-3

A 44-year-old private bank manager presented with the complaint of right gluteal deep ache with burning sensation down the right lower limb. The pain aggravated while he took prolonged sitting posture in his job and long drive as well. He complained about several bouts of nocturnal twinge in the same leg. Right lower extremity pain had also been aggravated with lotus posture. Physical examination revealed nothing significant abnormalities concerning musculoskeletal and nervous system. On further screening, FAIR, Pace, SLR maneuvers were insignificant. Thereafter we examined patient’s wallet (1.5 cm × 9 cm × 12 cm) (Fig. 3) and found it heavily stuffed with various plastic cards and scraps, making it fatty enough to put exorbitant pressure on his buttock. Considering all, our clinical remark regarding the problem was fat wallet syndrome or wallet neuritis. At initial visit, we recorded his VAS for pain score, 6/10. MRI of lumbo-sacral spine revealed nothing significant changes supporting disc, nerve root, and

facet joint pathology either. The patient had been asked to avoid back pocket wallet and we recommended him to initiate piriformis stretching exercise. To be interesting, in second follow-up the patient reported complete resolution of his gluteal and lower extremity pain, with even lower VAS (1/10) pain score; nonetheless, the patient reportedly felt periodic aggravated right lower limb pain providing that he took part a long-distance bus journey while remained seated for long.

3. DISCUSSION

Women love their purse and men like their wallet. Wallet neuritis has been well-described in men; and synonyms frequently used in literature to describe the condition are hip-pocket syndrome, wallet-neuropathy, wallet sciatica, walletosis, fat wallet neuritis, fat wallet syndrome, credit-carditis, etc [1, 3]. When men sit on their large, fatty wallet for long-time, it adversely affects their postural balance, stressing low back anatomy [2]. Hip pocket syndrome reportedly focused in affluent society first in 1966 [4]; a law-

yer who used to bear a congested back pocket wallet that compressed adjacent sciatic nerve, generating sciatica like manifestations. Similarly, Lutz depicted sciatic neuritis as a pressure neuropathy thought to be originated from prolonged use of loaded wallet [1].

How does loaded wallet produce lumbago sciatica features? Repetitive compression, focal neural edema, expression of Nav1.8 channels in endoneurial Schwann cells around compressed sciatic nerve [5-7], with resultant sensitization of the compressed nerve can be the answer of this quest. Both acute and chronic compressions make nerve compromised to vascular supply [6]. In addition, peri-neural fibrosis due to proliferation of fibroblasts observed in rat models: acute cases, tissue fibrosis began as early as 4 hours after the compression and observed though out the study period, whereas this histological changes found to occur after 1-3 months in chronic sciatic nerve compression with loose silicon tube [6]. In their original work Frieboes and colleagues evaluated constriction induced peripheral neuropathy in animal models [7]: 'chronic compression causes up-regulation of *c-fos* gene in spinal sensory afferents neurons within 1-2 weeks after injury due to increased neural sensitivity, nevertheless, neuro-inflammatory markers namely TNF- α and IL-6, *etc.* do not increase further'. Expressed *c-fos* gene was associated with Schwann cell sodium channels (Nav1.8), perpetuating peripheral sensitization of the affected nerve, generating hyperalgesia, allodynia, *etc.*'

However, the most devastating consequenc of this chronic peripheral nerve compression happens when it gets centrally sensitized. Sensitized central part of afferent nociceptive fibers (myelinated A δ and unmyelinated C-fibers) release various neurotransmitters namely glutamate, substance P, ATP, somatostatine, neurokinins, *etc.* in the superficial lamina of dorsal horn of the spinal cord, activating post-synaptic NMDA receptor, with resultant activation of wide range of intra-cellular kinases including neuronal nitric oxide synthase, promoting neuroplasticity. Besides, they sensitize central projections of spinal cord to thalamus, periaqueductal grey matter, and rostral ventro-medial medulla [7, 8]. Role of non-neuronal glial cells especially microglia, has also been evaluated in central sensitization mechanism [9]. To be specific, central sensitization is a phenomenon resulting from activation of complex neural pathways; and fibromyalgia, irritable bowel syndrome, *etc.* are the common examples of its kind in pain practice.

Previous published works described wallet sciatica as a variety of piriformis syndrome [10]; but isolated wallet neuritis is also possible [1]. In our second case, patient *per se* assumed, it was his wallet inducing gluteal pain; henceforth decided to discontinue such with, eventually got rid of pain as well. Prolonged squatting while tiles' fitting in kitchen exposed patient's piriformis muscle and adjoining sciatic nerve under great stress, generating gluteal and homo-lateral radiating lower limb pain. On the other hand, in our 1st and 3rd cases, chronic external sciatic nerve compression from fatty wallet is well-supported by Stewart and Bosma study [11, 12]. As per Bosma and colleagues, lotus posture (meditation posture) [11] triggered severe sciatic nerve pathology generating buttock and ipsilateral lower extremity pain, weakness, and devastating leg muscles atrophy, foot drop,

etc. that echoed in our study as well, albeit none of our patients' (1st and 3rd) developed leg muscle wasting and foot drop. They were not positive for Pace and FAIR maneuvers (sensitive and specific for piriformis syndrome) either. To be more, wallet-compressed ipsilateral superior / inferior gluteal nerve / vessels may also attribute to buttock pain. Here, radical walleectomy improved symptoms in all our patients', though piriformis muscle intervention with steroid-lidocaine combination was required in our second case. I advised them to continue with piriformis muscle stretching exercises. Fortunately, none of our study subjects developed features that matched with central sensitization, namely fibromyalgia, irritable bowel syndrome, *etc.*, nonetheless reported to be possible if persistent somatic pain left untreated or poorly managed as had been demonstrated in one of my previous studies [13].

Previously, wallet neuritis had been described in lawyer, laborer [1, 10, 14]. Recent time, Hamoud and colleague describe wallet sciatic neuritis in both male and female doctors, though did not explain precisely the mechanism behind such pathology [15]. Tyrrell, *et al.* described sciatica symptoms in an unconscious laborer while his buttock got stuck in toilet seat, supporting wallet sciatic compressive neuropathy [14]. Sciatic nerve compression is reportedly possible from compression of rear pocket cell phone, golf ball, handkerchiefs, even after prolonged sitting on hard surface including car seat [15]. Here in this study, we describe this clinical scenario in three different professionals namely specialist doctor, driver, and banker. All these three professionals adopted prolonged sitting on rear pocket wallet during their professional work, long journey, compressing same side sciatic nerve generated lumbago sciatica like features, even after discontinuing rear pocket stuff with, probably owing to sensitization of sciatic nerve to repeated compression.

Here, wallet neuritis diagnosis was straightforward; nevertheless, most often it can be confused with clinical conditions of several low back pain generators like facet joint (lumbar facet arthropathy), sacroiliac joint (sacroiliac joint dysfunction), lumbar spinal canal (stenosis), piriformis muscle (piriformis syndrome), ischial bursa (bursitis), auricular part of ilium (osteitis condensans illi), hip joint (hip arthropathy), hamstring muscle origin (hamstring muscle rupture), *etc* [3, 10, 13]. Most importantly, we were cautious about them during patients' screening. Wallet neuritis, a diagnosis of exclusion of aforementioned conditions as well. MRI of lumbo-sacral spine revealed nothing significant change for spine pathology. Nerve conduction study (NCS) revealed features of sciatic nerve demyelination in one patient, that has been well-matched with Hughes findings [16]. Ultrasonogram of gluteal region (3.5 MHz, Siemens Acuson X300, premium edition, transducer: CH 5-2, Germany) showed piriformis muscle thickness in one wallet sciatica, signifying associated muscle hypertrophy, spasm as a consequence of overusing it [13].

In fine, long-standing use of hip pocket wallet produces sciatica like features, sometimes making it difficult to differentiate them from their spinal counterparts. Wallet whether stuffed with credit card or not, having compressed sensitized sciatic nerve, generate clinical features alike sciatica even though patient discontinue such stuff with, boos previously

used terminology “credit-carditis”; nonetheless approves fat wallet syndrome, walletosis, *etc.* But, we are still in doubt, exactly what size of wallet induces sciatica? What sort of wallet is safe or ought to be avoided? How long does it require to develop a sensitized sciatic nerve using fatty wallet? I surmise, prospective multicentre study among rear pocket wallet users can provide the answer of these quests.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by Ethical review committee, Chittagong Medical College Memo. no: CMC/PG/2014/15; Date: 04/05/2014.

HUMAN AND ANIMAL RIGHTS

No animal were used in this study, reported experiments on humans were in accordance with the ethical standards of the committee responsible for human experimentation (institutional national), and with the Helsinki Declaration of 1975, as revised in 2008 (<http://www.wma.net/>).

CONSENT FOR PUBLICATION

Written informed consent was obtained from all the patients for this study.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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REFERENCES

- [1] Lutz EG. Credit-card-wallet sciatica. *JAMA* 1978; 240(8): 738.
- [2] Viggiani D, Noguchi M, Gruevski KM, Carvalho DD, Callaghan JP. The Effect of Wallet Thickness on Spine Posture, Seat Interface Pressure, and Perceived Discomfort During Sitting. *IISE Transactions on Occupational Ergonomics and Human Factors* 2014; 2: 83-93.
- [3] Sai Teja T, Sai Krishna G, Krupa Sagar Y, Komal Krishna T. Fat wallet syndrome: a mini review. *Eur J Biomed Pharm Sci* 2016; 3: 633-5.
- [4] Battle JD. Credit-carditis: a new clinical entity? *N Engl J Med* 1966; 274: 467.
- [5] Boyajian-O'Neill LA, McClain RL, Coleman MK, Thomas PP. Diagnosis and management of piriformis syndrome: an osteopathic approach. *J Am Osteopath Assoc* 2008; 108(11): 657-64.
- [6] Rempel DM, Diao E. Entrapment neuropathies: pathophysiology and pathogenesis. *J Electromyogr Kinesiol* 2004; 14(1): 71-5.
- [7] Frieboes LR, Palispis WA, Gupta R. Nerve compression activates selective nociceptive pathways and upregulates peripheral sodium channel expression in Schwann cells. *J Orthop Res* 2010; 28(6): 753-61.
- [8] D'Mello R, Dickenson AH. Spinal cord mechanisms of pain. *Br J Anaesth* 2008; 101(1): 8-16.
- [9] Hathway GJ, Vega-Avelaira D, Moss A, Ingram R, Fitzgerald M. Brief, low frequency stimulation of rat peripheral C-fibres evokes prolonged microglial-induced central sensitization in adults but not in neonates. *Pain* 2009; 144(1-2): 110-8.
- [10] Siddiq MA, Hossain MS, Uddin MM, *et al.* Piriformis syndrome: a case series of 31 Bangladeshi people with literature review. *Eur J Orthop Surg Traumatol* 2016; 27(2): 193-203.
- [11] Bosma JW, Wijnjes J, Hilgevoord TA, Veenstra J. Severe isolated sciatic neuropathy due to a modified lotus position. *World J Clin Cases* 2014; 2(2): 39-41.
- [12] Stewart JD, Angus E, Gendron D. Sciatic neuropathies. *Br Med J (Clin Res Ed)* 1983; 287(6399): 1108-9.
- [13] Siddiq MA, Khasru MR, Rasker JJ. Piriformis syndrome in fibromyalgia: clinical diagnosis and successful treatment. *Case Rep Rheumatol* 2014; 2014: 893836.
- [14] Tyrrell PJ, Feher MD, Rossor MN. Sciatic nerve damage due to toilet seat entrapment: another Saturday night palsy. *J Neurol Neurosurg Psychiatry* 1989; 52(9): 1113-5.
- [15] Hamoud K, Abbas J. Unusual Sciatic Pain due to Wallet Compression A Clinical Case Series and Literature Review. *J Clin Case Rep* 2016.
- [16] Hughes SS, Goldstein MN, Hicks DG, Pellegrini VD Jr. Extrapelvic compression of the sciatic nerve. An unusual cause of pain about the hip: report of five cases. *J Bone Joint Surg Am* 1992; 74(10): 1553-9.