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PAINFUL-POST TRUAMATIC TRIGEMINAL NEUROPATHY: CASE SERIES AND A REVIEW OF LITERATURE

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Abstract: OBJECTIVE: This paper reports the diversity of clinical presentations and underlying causes of painful post-traumatic trigeminal neuropathy, various treatment outcomes and factors that may influence recovery.

METHODS: Summary of accounts of five patients that were diagnosed with painful post-traumatic neuropathy in the oral medicine clinic, University of Benin Teaching Hospital. The cases were treated with pregabalin combined with vitamin B complex or neurobion (high dose vitamins B1, B6, and B12), and followed up for treatment outcomes.

CASE REPORTS: Case 1 was a 32-year old female. She started experiencing left facial pain with loss of sensation and taste on the left side of her tongue 6 weeks after surgical extraction of her lower left third molar. Case 2 was a 57-year old female with complaints of pain in the right preauricular region shortly after commencement of root canal treatment in her lower right second premolar. Pain was provoked by yawning and brushing the left side of her tongue. Case 3 was a 21-year old male who had complaints of pain and heaviness of the lower lip which began shortly after surgical extraction of lower right third molar. Case 4 was a 35-year old male, who started experiencing partial loss of sensation on the left side of the lower lip and the associated labial mucosa. The symptoms began immediately after surgical extraction of lower left third molar. Case 5 was a 48-year old female teacher who had a traumatic extraction of her upper left 1st molar and started experiencing loss of sensation on the left side of her upper lip afterwards. This persisted for 6 months prior to presentation and was associated with inadequate oral seal.

CONCLUSION: This study shows that painful-post traumatic trigeminal neuropathy has diverse clinical presentations. Prompt pharmacological intervention, and follow-up periods are needed to assess treatment outcomes.

Keywords: Trigeminal neuropathy, Trauma, Treatment outcomes

INTRODUCTION

Painful post-traumatic trigeminal neuropathy (PPTTN) is a neuropathic pain characterized by facial and/or oral pain along the sensory distribution of the trigeminal nerve with a definite history of a traumatic event [1]. The trauma can be either accidental or iatrogenic [2] .

The incidence of painful neuropathy following injuries to the peripheral branches of the trigeminal nerve is reported as 3–5 % [3]–[6]. Most commonly affected branches of the trigeminal nerve are the inferior alveolar nerve (IAN) which carries general sensation for the mouth, teeth, lip and chin, and the lingual nerve (LN) which subserves general and special sensation (taste) for the anterior two-thirds of the tongue, floor of mouth, and lingual mucosa of the mouth [7]. The incidence of injury to either of these nerves by elective dental or oral and maxillofacial surgical procedures ranges from 0.6% to 90% [6], [8], [9]. Of the injured trigeminal nerves, the incidence of developing post-traumatic neuropathic pain has been reported to range from 0.45% -70% [10], [11] of the injuries affecting the inferior alveolar nerve and lingual nerve.

The most common cause of injury, in order of occurrence, is lower third molar extraction, reconstructive mandibular surgery, mandibular trauma, dental injection, dental implant placement, dental endodontic therapy, or the consequence of pathology of the oral cavity or surgery for pathology of the oral cavity [12], [13].

The clinical presentation of PPTTN is similar to other sensory nerves; however, due to the anatomic location, the psychological and functional impact is greater than other nerve injuries [7]. It ranges from loss of sensitivity to severe neuropathic pain [14] which may have burning or shooting-like qualities accompanied by positive (hyperalgesia, allodynia) and/or negative (hypaesthesia, hypalgesia) changes in the neurologic profile. The neuropathic pain may be constant or paroxysmal in duration [1], [7]. A combination of environmental (reduced social support) [6], psychosocial (anxious, introverted personalities) [15], and genetic factors (polymorphism in the gene encoding serotonin transporter) contribute to the variable clinical presentations among individuals [4], [15].

The mechanism for PPTTN has been reported to be due to the peripheral sensitization or activation of nociceptors from the release of inflammatory mediators from tissue injury and also increased pressure secondary to inflammation [16] which may then induce nerve damage resulting in neural dysfunction [6]. Certain stimuli that may also induce pain include touch, cold, talking, eating, drinking, and kissing [7].

Diagnosis of PPTTN is mainly clinical, relying heavily on the clinician's impression[1]. However it is usually preceded by an identifiable definite traumatic event to the painful area and the neuropathy usually develops within 3 months of the traumatic event [4].

The main stay of medical treatment of PPTTN include anticonvulsants (e.g. gabapentin, pregabalin) and tricyclic antidepressants (e.g. amitriptyline) and newer antidepressants (e.g.duloxetine) [17], [18]**.** Opioids are a viable alternative if the anticonvulsants or antidepressants are ineffective [17]**.** The role of surgery for PPTTN is unclear requiring further investigation [1]. Peripheral surgical interventions aimed at pain relief are generally contraindicated, however microsurgical nerve repair may offer some improvement in sensation [17]. In all, non-surgical treatment of PPTTN remains a safer option [7]. Psychotherapeutic intervention is recommended for distressed and anxious patients [4], [18].

This case series report is aimed at high-lighting the diverse clinical presentations and treatment outcomes of PPTTN.

METHOD

Five patients with sensory dysfunction involving the trigeminal nerve following dental treatments were diagnosed with painful post-traumatic neuropathy in the Oral medicine clinic of the University of Benin teaching hospital, Edo Sate, Nigeria. The patients were placed on pregabalin and vitamin B complex or neurobion. Each patient was followed up for a minimum of 2 months for treatment outcomes.

CASE REPORTS

Case 1

A 32-year old female with complaints of severe pain on the left side of her face and tongue which began six weeks after surgical extraction of lower left third molar. There was also associated loss of sensation and taste on the left side of the tongue which started immediately after the surgical extraction. Intra-oral examination showed the extraction site was clean and had healed satisfactorily. A diagnosis of painful post-traumatic trigeminal neuropathy was made. Patient was placed on vitamin B-complex one tablet a day for one month, pregabalin 75mg nocte for a week. A one-week review revealed improving condition with less pain, however, there was still loss of sensation on the left side of the tongue. Pregabalin was continued for another one month at same dose. On a subsequent review, there was absence of pain but patient still experienced loss of sensation and taste on left side of the tongue. Patient was followed up for 3 months and last review revealed slight

improvement in the sensation and taste perception on the left side of the tongue.

Case 2

A 57-year old female with complaints of pain around the right ear, difficulty in chewing and restricted mouth opening all of one month duration. She was referred from the Conservative clinic in between visits for a root canal treatment of her lower right first premolar. The symptoms began about a week after the endodontic procedure was commenced. The pain was provoked by yawning and brushing the left side of the tongue. On examination, there was severe tenderness in the right pre-auricular region, other findings were normal. An initial impression of myofascial pain was made and patient was placed on Norgesic (aspirin/caffeine/orphenadrine) 2 tablets twice daily for one week. Subsequent review showed no improvement in the patient's condition. The tooth was not responsive to pulp vitality tests, and findings from the periapical digital radiographs were clinically normal. A diagnosis of painful post-traumatic neuropathy secondary to root canal therapy was made and the patient was immediately commenced on pregabalin 75mg twice daily for one week. A review visit revealed marked improvement in the pain sensation with better mouth opening. Patient was continued on pregabalin 75mg twice daily for 2 weeks and olfen gel (diclofenac 1%; a nonsteroidal, anti-inflammatory and analgesic preparation) for 4 weeks. Patient's condition resolved within 4 weeks of treatment and was followed up for 2 months.

Case 3

A 21-year old male with complaints of pain and heaviness on the lower lip of about one-year duration. The pain was continuous and severe (Numerical rating scale score 6) but was not associated with sleep disturbance. The symptoms began shortly after a surgical extraction of the lower right third molar done a year earlier. There was initial numbness and tingling sensation on his lips which later progressed to pain. Patient was placed on neurobion for several months by a general dental practitioner and there was no improvement. On examination, lips appeared clinically normal. Right side of lower lip (to the midline) was tender on palpation. The mandibular right third molar was missing with no obvious abnormality over the extraction site. Periapical radiograph was taken and revealed no remnants of the previously extracted tooth nor any other pathology. An assessment of post-traumatic trigeminal neuropathy was made. Patient was then placed on tab pregabalin 75mg daily for one week. There was marked improvement of the symptoms on review. The therapy was extended for another 2 weeks, patient however failed to show up for next appointment and all attempts to reach patient were unsuccessful.

Case 4

A 35-year old male doctor with complaints of loss of sensation on the lower lip and the associated labial mucosa of one-year duration. Patient had an eventful extraction of the left mandibular third molar a year earlier, as the presurgical assessment predicted difficulties with the extraction. Following the extraction, patient immediately started experiencing loss of sensation on the lower lip and the associated labial mucosa, and difficulty in pronunciation of certain sounds which resolved on its own. Four weeks after the extraction patient presented to the oral surgeons with complaints of persisting loss of sensation and tingling sensation, he was then placed on tab dexamethasone 2mg twice daily and neurobion 1 tablet twice daily for 2 and 6 weeks respectively by the oral surgeons. Symptoms, however, did not improve over the next couple of months. He presented in the Oral medicine clinic a year after the surgical extraction due to the persistent symptoms, and a diagnosis of PPTTN was made. Patient was reassured, and placed on tab pregabalin 75mg daily for 2 weeks. There was no improvement on review visit. He opted to be on periodic observation with no medications.

Case 5

A 48-year old female teacher with complaints of loss of sensation on the left side of her upper lip following a traumatic extraction of her upper left first molar. This persisted for six months prior to her presentation at the Oral Medicine clinic. Upon presentation she had problems keeping an adequate oral seal as her facial muscles usually felt stiff with pain after prolonged talking. This began about a month after the extraction. Periapical radiograph of the extraction site showed the site was clear with no other pathology. Patient was commenced on pregabalin 75mg twice daily for 2 weeks and neurobion one tablet daily for 2 weeks. On the review visit, there was improvement in the numbness on the upper lip. The medication was extended for another one month. Subsequent review revealed marked improvement in the sensation on the upper lip and absence of pain from the facial muscles after prolonged talking. Patient was maintained on pregabalin 75mg daily and neurobion 1 tablet daily and followed up for 4 months. Subsequent reviews revealed complete recovery of the sensation on the left side of the upper lip with less muscle stiffness upon talking with some improvement in the oral seal.

DISCUSSION

With the increasing demand for dental treatments, injuries to the trigeminal nerve are becoming a common occurrence[14]. PPTTN is increasingly becoming a common clinical condition in our environment mostly following extraction of impacted lower third molar which has been reported in literatures to be the most common cause of PPTTN [13], [19], [20]. This was observed in this report as 3 of the 5 reported cases occurred following extraction of lower third molars. Other implicated causative factors include endodontic therapy, mandibular trauma, dental injections and dental implants. A rare case of PPTTN following endoscopic sinus surgery has also been reported [1].

The main risk factors for the nerve(s) injury are the surgical skill/experience of the surgeon and the radiographic proximity of the tooth apexes to the IAN and/or LN respectively [21]. Sectioning of the crown may serve as a viable option to avoid such injury [22].

Though the clinical presentation varies widely, the sensory dysfunction will often follow the region supplied by the IAN and/or the LN which are the branches of the trigeminal nerve mostly injured [1]. All the patients in this report experienced numbness in the region of the affected nerve. Injured IAN and LN may recover spontaneously but persistent cases can adversely affect the patient's quality of life [21]. Spontaneous recovery has been shown to depend on the modality and severity of the injury [23], [24]. Wofford reported the incidence of spontaneous recovery 6 months after a causal lesion to be quite low [25]. None of our patients in this report experienced spontaneous recovery. Other factors that influence treatment outcome include duration, (time from injury), location, age of the patient, surgical reconstruction of the injured nerve [7], [20].

The clinical outcome following treatment is quite unpredictable and highly variable. This was demonstrated in the cases in this report. The patient who was diagnosed with PPTTN secondary to endodontic treatment (case 2) experienced complete remission within 4 weeks of medical treatment. Complete recovery of the sensation was also seen in the patient with extraction of upper left 1st molar (case 5). This was suggestive of the possibility of a minor nerve injury. Of the patients diagnosed with PPTTN following surgical extractions of lower third molar, case 3 had marked improvement. Cases 1 and 5 had showed mild improvement and no improvement of symptoms respectively, and extraction of the upper first molar respectively, hinting at a more severe nerve injury. All the patients were counselled on the unpredictable treatment outcomes before commencement of drug therapy.

The best management of PPTTN lies in preventive measures[7]. A very detailed pre-operative assessment for all dental procedures, lower third molar surgery performed

with utmost skill, and avoidance of elective surgery for high risk patients is thus advocated [7]. These measures coupled with early referral of cases to the oral physician for prompt intervention will contribute markedly to a favorable treatment outcome [14]. It is however generally acknowledged, even when maximum care is taken, surgeries for removal of lower third molar poses a great risk and this must be duly communicated to the patient [20]. An alternative pain management modalities currently proving effective and requiring further research for trigeminal neuropathic pain include acupuncture, low level laser therapy and transcutaneous electric nerve stimulation (TENS) [26]–[28].

CONCLUSION

This study reports injuries to the trigeminal nerve can arise from different dental treatments and a proper pre-operative assessment and surgical skill is very necessary in reducing the risk of nerve injury. Early diagnosis with prompt intervention is very crucial in the treatment outcome and psychosocial wellbeing of the patient.

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