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# CO-OCCURRENCE OF RECURRENT MIGRAINOUS HEADACHES AND TRANSIENT GLOBAL AMNESIA FOLLOWING MINOR HEAD TRAUMA: A CASE REPORT

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## ABSTRACT

A 32-year-old male, with a history of recurrent throbbing headaches, presented with three episodes of minor trauma to the head followed by throbbing headaches and blurred vision. In two of these episodes, he also had clinical features suggesting the occurrence of transient global amnesia (TGA) at the same time. Although migraines as well as TGAs are reported to occur following minor head trauma, the simultaneous occurrence of both is rather unusual and would support the fact that spreading depression is the main pathophysiological mechanism underlying TGAs as it is for migraines. We report an unusual case of migraine and TGA occurring simultaneously in a footballer after minor head trauma.

**Keywords:** Trauma, Footballer's migraine, Transient global amnesia

## INTRODUCTION

The role of minor head trauma as a triggering factor for migraine headaches has been recognized for many years.<sup>1</sup> These headaches are also commonly referred to as footballer's migraines, after the original description by Matthew et al, although the source of such impacts may vary.<sup>2</sup> The occurrence of transient global amnesia (TGA) following similar impacts is also reported though less frequent.<sup>3,4</sup> The simultaneous occurrence of headaches as well as TGA following such episodes is even more infrequent.

We report a case of a young patient who had recurrent simultaneous episodes of TGA as well as migraines following such head impacts.

## CASE PRESENTATION

Mr. RKG, a 32-year-old male, was admitted to Aga Khan University Hospital for evaluation of severe headaches.

He was completely all right till 1984, when, at age 12 years, he fell from a tree from a height of approximately 15 to 20 feet. He sustained trauma to the head and was unconscious for about 24 hours. He was admitted to a hospital in Gilgit, in Northern Pakistan, where he resided. No further details are available about the investigations or treatment, but apparently, no surgery was performed. He slowly recovered and was discharged in a few days. He had a significant loss of memory for events just before and after the fall, which slowly improved over two months.

Since then, he started to develop recurrent headaches. These would occur without any premonitory symptoms, would gradually increase in intensity, and were of a throbbing nature, mainly occipital, and associated with nausea and occasional vomiting. These would last four to six hours at a time. The initial frequency was around an attack every four to six months; of late, the frequency had increased, to about an attack every two to three months.

In addition, he had three episodes of events that were associated with minor impacts to the head. The first episode occurred in the winter of 1987, when he fell off a sledge, and landed on his head on ice. There were no major injuries. Within minutes, he started to develop severe occipital throbbing headaches. These were associated with loss of peripheral vision bilaterally. The whole episode lasted for the next four to six hours, followed by a complete recovery.

The second episode occurred in 1996 when he was playing football. During a pass, the football hit him on the occipital region. He does not remember what happened next. He recalls that, according to his teammates, he continued to play football for a while, but was behaving oddly. He could not coordinate well with the other players, and, after a while, retired from the field, complaining that he could not see. His family also noted odd behavior at home, where he appeared confused and agitated. He finally started to regain his awareness at night after seven to eight hours. He complained of severe throbbing occipital headaches

with blurred vision. He vomited after another half an hour. He started to recover afterward and went off to sleep. He was fully normal in the morning.

A similar episode occurred in 2002 during a football game. He remembers that he collided with another player and was hit in the occipital region. He does not remember what happened next. According to his teammates, he continued to play for the next half an hour or so, but his behavior was odd, his speech repetitious, and he complained that he could not see the ball well. He was taken to a hospital after the game. He was started on an intravenous drip and some medications. No investigations were done. He started to regain his awareness over the next few hours. Upon recovery, he noticed the occurrence of occipital headaches and blurred vision. He had nausea and vomiting, following which his symptoms started to recover.

He was an amateur football player and recalls that he had headed the football many times with the frontal region but had not once encountered any problems. The above episodes took place only following impacts to the occipital region.

There was no family history of headaches or epilepsy. He worked as a hospital porter. There were no other reported illnesses. His physical and neurological examinations were unremarkable. An MRI Head Scan was normal, as was the EEG. Other lab investigations were also normal.

He was advised to take non-steroidal anti-inflammatory medications for his infrequent migraine headaches, and to try and avoid being hit on the head, especially in the occipital region. He followed up for the next six months with symptomatic improvement in headache intensity. No further episodes of altered behavior or headaches related to trauma were reported. He was subsequently lost to follow up.

## DISCUSSION

Headaches are frequently observed in those suffering from minor head trauma.<sup>1</sup> This minor trauma can also trigger post-traumatic migraine headaches in those who are susceptible and have no prior history; seen more frequently in children and young adults.<sup>2</sup>

Migraine headaches in relation to head trauma have been described in several contexts. Migraine attacks may be part of the clinical syndrome following head trauma, presumably by causing biological and/or structural changes. It may also be part of a broader 'post-traumatic' syndrome, which includes a range of

somatic and cognitive symptoms.<sup>3</sup> However, migraines triggered each time by a mild impact to the head, e.g., being hit by a football, etc, as in our patient, is not a common phenomenon, and was first described by Matthews et. al, and commonly referred to as 'footballer's migraine'.<sup>4</sup> Typically, the trauma is not severe enough to cause a loss or alteration of consciousness, but it triggers the typical migraine headache, which may or may not be associated with aura. It is presumed that brief traumatic episodes stimulate trigeminal afferent sensory pathways like those in idiopathic migraine.<sup>5</sup> Also, minor head trauma and concussions release extra excitatory amino acids (endorphins) within the system. Our patient appeared to have features that were consistent with the descriptions in the original cases of Matthews et al.<sup>4</sup>

In addition, the second and third episodes in this patient were also preceded by symptoms that clearly suggest transient global amnesia; i.e., loss of recent memory, continuation of motor and other complex functions (e.g., he was observed to have continued to play football despite reporting later that he was unaware of what was going on), confused and agitated behavior, complete recovery in a few hours and amnesia for the event.

The association of transient global amnesia being triggered each time by a similar mild head impact was first described by Haas and Ross, and later by Carvey and his colleagues.<sup>6,7</sup> It is unclear; however, whether any of these attacks featured the simultaneous occurrence of migraine headaches as well as features of TGA.

Another interesting observation in our patient was that these attacks occurred only when he had these 'head impacts' to the occipital region, and never occurred when these impacts were in any other region of the head. As a football player, he had headed the ball several times with the frontal region but did not once experience any problem. Although the differential effects of impacts to the frontal and occipital regions have not been elaborated upon in the literature, it appears significant, since the pathophysiological changes leading to migraines originate at the level of the midbrain and those leading to TGA appear to lie in the medial temporal lobes bilaterally.<sup>8</sup> Minor head impacts to the occipital region may be triggering off shearing forces leading to neurochemical and other changes in the above areas, and manifesting clinical changes. This requires further study.

The pathophysiology of TGA is still not clearly understood. Current hypotheses include migraine,

seizures, or transient cerebral ischemia, although, so far, none of these mechanisms have been able to explain all of the clinical and associated features of TGA.<sup>9</sup>

It is suggested that the spreading depression theory could explain the changes noted in TGA and venous congestion with ischemia in the memory regions of the brain.<sup>10</sup> Recent work by Strupp et al, using functional MRI techniques showed changes in both the mesial temporal lobes in these patients, and the signal abnormalities reflected changes along the pattern seen in spreading depression rather than in focal ischemia.<sup>11</sup>

The occurrence of both TGA and migraines simultaneously would further support the spreading cortical depression theory as the basic pathophysiologic phenomenon that is responsible for TGA, as it is for migraines. Nationwide cohort in Taiwan demonstrated an increased incidence of transient global amnesia in patients with migraine particularly in females between 40-60 years of age. It was also observed that no difference existed between patients with migraines with aura and without aura.<sup>12</sup>

The exact relationship of migraine headaches and TGAs with trauma is unclear. Mild head trauma may cause diffuse axonal injury due to shearing forces, and the midbrain – the site of the ‘migraine generator’ is especially vulnerable. In addition, neurochemical studies in mild head injury have shown to cause the release of excitatory neurotransmitters, acetylcholine, and glutamate, as well as alter levels of GABA and opioids.<sup>5</sup> Similar studies in the pathogenesis of TGA are not available.

## **CONCLUSION**

The simultaneous occurrence of both migraine headache and TGA, as in our patient, strongly suggests that both these clinical events share a common pathway, most likely through the spreading depression mechanism. The answer to some of these questions may shed further light on the underlying mechanisms of both conditions. Footballer’s migraine is still an under-recognized entity. A better understanding of this condition would lead to improved diagnosis and timely management for these patients.

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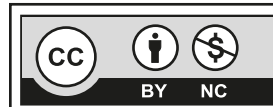
Authors' contribution:

**Aziz Badruddin Sonawalla;** concept, case management, manuscript writing

**Saadia Arshad;** case management, manuscript writing

**Shafaq Saleem;** case management, manuscript writing

All the authors have approved the final version of the article and agree to be accountable for all aspects of the work.



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