ORIGINAL ARTICLE

Open label study of intranasal sumatriptan (Imigran) for footballer's headache

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Objective: To study the efficacy and practicality of treating headache in professional footballers with intranasal sumatriptan.
Methods: An open label drug trial was performed in elite Australian footballers using intranasal sumatriptan (20 mg) treatment for acute headache. The main outcome measures were treatment response at 30 minutes, two hours, and 24 hours using two criteria: (*a*) initial severity moderate or severe to nil or mild; (*b*) stricter criteria of initial severity moderate to severe to subsequent nil headache.
Results: Thirty eight attacks were analysed. The two hour response showed that 86% of attacks of migraine with aura and all of the attacks of migraine without aura responded to treatment with sumatriptan nasal spray. Complete relief of headache at two hours was reported by 71% of players with migraine with aura and 90% of those without aura. Recurrence rates were generally low, with 0% of migraine headaches and 25% non-migraine attacks recurring at 24 hours. Minor side effects were reported in 28 attacks.
Conclusions: This pilot open label trial suggests that sumatriptan nasal spray may be a valuable, effective, and convenient treatment of headache in professional sport. There are potential risks of this drug that need to be considered.

The prevalence of headache in different sport is largely unknown.[1 2] In a recent unpublished survey of elite professional Australian football, about 80% of players had regular headaches, of which one third fulfilled the World Health Organisation/International Headache Society (WHO/IHS) criteria for migraine.[3]

The only published prevalence study on sport related headaches found that they were reported by 35% of all respondents, with no sex bias evident.[4 5] Community studies also note exercise as a potent trigger of migraine and other forms of headache, but the precise epidemiology of this phenomenon is unknown.[6]

Intranasal sumatriptan is a widely used drug for the treatment of acute migraine, with a safety record extending back more than a decade.[7 8] There are potential theoretical concerns about its use in sport such as increasing coronary artery vasospasm and the risk of arrhythmias during strenuous exercise. Although extensively studied in a community setting, acute migraine headache has not been the subject of previous study in professional sport, the demands of which are such that treatment needs to be rapid, effective, and practical.

METHODS

Subjects with headache were obtained from elite professional Australian footballers. Informed consent was obtained from all players. Players were asked to report to their club doctor when they developed a headache. The club doctor assessed the patient by history taking and examination. If there was no contraindication to sumatriptan treatment, the player was treated with a single dose of 20 mg sumatriptan nasal spray.

A headache diary was completed by the club doctor detailing the time of onset and clinical features of the headache. Clinical features included the presence of nausea, light or noise sensitivity, throbbing, aura symptoms, unilaterality, and severity. If aura had started before the headache, the player was permitted to take the sumatriptan at that point. Players were asked to record the severity of the headache at 30 minutes, two hours, and 24 hours after the treatment. These time intervals are standard efficacy measures used in headache studies. Any additional drug taken for the attack was recorded, together with adverse events. Recurrence of headache was defined as complete resolution of the headache with recurrence within 24 hours.

Headaches were classified as migraine without aura (IHS 1.1), migraine with aura (IHS 1.2), and non-migraine headache according to the International Headache Society (IHS) criteria[3] as adopted by the World Health Organisation.[9] Treatment response at each time epoch was measured by two criteria: (*a*) initial severity moderate or severe to subsequent intensity nil or mild; (*b*) stricter criteria of initial severity moderate to severe to subsequent nil headache. These are standard measures of drug efficacy used in headache studies. Headache attacks that were mild at onset were analysed separately because, under WHO/IHS guidelines, mild intensity of headache cannot be formally classified as migraine.

Statistical analysis

Crude proportions of outcomes (crude %) and corresponding 95% confidence intervals are reported. Because of repeated observations on some subjects, further analyses of these proportions were required. When repeated headache episodes occurred in the same subject, the theory of generalised estimating equations (GEE) was used to take into account the non-independence of some clusters of observations. In particular, a logistic regression was fitted to the data with only the intercept estimated, and an exchangeable correlation structure was used to produce the standard errors. The logistic model was then inverted to produce a proportion (GEE%) and corresponding confidence interval. GEE were further used to estimate the association between the outcomes and the predictors. The model fitted here had a log link (with binomial family) to enable results to be presented as relative risks. The p value for Fisher's exact test is quoted where no observations were made for some outcome/predictor combinations (STATA 6th ed, 1999; STATA Corporation, Houston, Texas, USA).

Table 1 Attacks that responded to sumatriptan nasal spray (n = 28)

WHO/HIS category	Total No headaches	30 minute response: Nil or mild headache (%)	30 minute response: Nil headache (%)	2 hour response: Nil or mild headache (%)	2 hour response: Nil headache (%)
Migraine with aura	7	4 (57%)	2 (29%)	6 (86%)	5 (71%)
Migraine without aura	10	9 (90%)	8 (80%)	10 (100%)	9 (90%)
Non-migraine headache	11	5 (45%)	1 (9%)	8 (72%)	4 (36%)

Treatment response at each time epoch was measured by two criteria: (*a*) initial severity moderate or severe to subsequent intensity nil or mild; (*b*) stricter criteria of initial severity moderate to severe to subsequent nil headache.

RESULTS

Thirty eight attacks were analysed in 26 footballers. Seven of the attacks were migraine with aura, 10 were migraine without aura, and 11 were headaches outside the WHO/IHS criteria for migraine. The remaining 10 headaches, which were mild at onset and could not be formally classified under the IHS criteria, were analysed separately as outlined above. None of the footballers in the study had been previously diagnosed as suffering from migraine, and all were treatment naïve.

The headache in 28 attacks was rated as moderate or severe by the player when treatment was taken (the remaining 10 headaches were rated as mild). Table 1 shows the results of treatment of these 28 moderate to severe attacks. They are classified according to the standard efficacy criteria set out in the section above. The response of subjects at two hours showed that 86% of attacks of migraine with aura and all of the attacks of migraine without aura responded to treatment with sumatriptan nasal spray. Complete relief of headache at two hours was reported by 71% of players with migraine with aura and 90% of those without aura.

The 11 non-migraine headaches also responded well to treatment, with 8/11 (72%) responding at two hours and 4/11 (36%) reporting complete relief at two hours. These could not be subclassified further under IHS criteria.

There were 10 headaches that were mild at onset, which were analysed separately. Although the numbers of attacks were small, the response rates show 100% relief for migraine with aura and 70% for non-migraine headache.

Recurrence rates were generally low, with 0% of migraine headaches and 25% of non-migraine attacks recurring at 24 hours after treatment. Players were judged able to return to match play after treatment in 31/38 (82%) attacks, with the remainder of headaches occurring at training or when concurrent injuries—for example, concussion in 4/38—prevented further participation. In players who returned to match participation after treatment, no deterioration of performance was evident. The use of additional analgesic drugs was reported by four players. It should be noted that, although the team doctors used in this study were experienced in the assessment of players with head injury, there is a risk that intracranial injury may present with headache in this setting and could be misdiagnosed as a migraine, thereby delaying critical definitive treatment.

Adverse events were reported in 28 attacks, with an unpleasant taste in the mouth occurring most commonly (22 attacks) followed by nausea (three attacks), rhinorrhoea (one attack), light headedness (one attack), and malaise (one attack). Chest and throat tightness has previously been reported with the use of sumatriptan,[10 11] but no players in this trial reported these symptoms.

Statistical analysis using generalised estimating equations to determine the association between headache features (presence of aura, nausea unilaterality, and severity of headache) and treatment outcomes (at 30 minutes, two hours, and 24 hour recurrence rate) did not show any significant association (table 2).

DISCUSSION

This pilot study suggests that sumatriptan nasal spray is a highly effective and well-tolerated treatment for headache in sport. These results must be treated with a degree of caution, as the study was not blinded, no placebo group was included, and placebo response rates can be significant in headache trials.[12] It is also important to note that the population under study was a group of professional footballers and is not representative of other patient populations. The nasal spray was administered to players at various times before, during, and after match play as well as during training and proved convenient to use.

Treatment of headache in professional sport is often difficult.[2] The high frequency of headaches in some sports, particularly football codes, creates many practical difficulties for the team doctor. Many conventional drugs used in the treatment of migraine and other forms of headache (such as β blockers, caffeine, codeine-containing preparations, dextropropoxyphene, narcotics, and opioids) are banned in professional sport. Sumatriptan has no known performance enhancing properties, and can be used in professional and Olympic sporting events.

Footballer's migraine was originally described as a post-traumatic phenomenon from heading the ball in soccer which was accompanied by a prominent visual aura.[13] Outside of soccer, ''footballer's migraine'' or ''footballer's

Table 2 Predictors of treatment response

Clinical feature	30 minute response: Nil or mild headache	30 minute response: Nil headache	2 hour response: Nil or mild headache	2 hour response: Nil headache
Aura	1.17 (0.79 to 1.74)	1.21 (0.59 to 2.48)	0.97 (0.82 to 1.15)	1.47 (0.98 to 2.20)
Unilateral headache	1.25 (0.83 to 1.89)	1.83 (0.84 to 3.99)	1.00 (0.86 to 1.16)	1.61 (1.00 to 2.59)
Nausea	1.10 (0.74 to 1.64)	1.48 (0.74 to 2.98)	0.98 (0.84 to 1.15)	1.59 (1.04 to 2.53)
Severity	0.76 (0.52 to 1.17)	0.48 (0.21 to 1.09)	1.04 (0.87 to 1.24)	1.17 (0.71 to 1.93)

Values are relative risk (95% confidence interval). Treatment response at each time epoch was measured by two criteria: (*a*) initial severity moderate or severe to subsequent intensity nil or mild; (*b*) stricter criteria of initial severity moderate to severe to subsequent nil headache.

What is already known on this topic

- Exercise has been reported to trigger migraine and other forms of headache, but the precise epidemiology of this phenomenon is not known.
- The incidence and treatment of headache in professional sport has not been investigated.

What this study adds

Sumatriptan nasal spray may be a valuable, effective, and convenient treatment of headache in professional sport.

headache'' is not clearly defined, with many cases occurring in the absence of trauma yet having migrainous features. In this paper the generic term of footballer's headache is preferred.

In this study, about 50% of headaches satisfying WHO/IHS criteria were accompanied by aura. The response to anti-migraine treatment was not significantly different between the migraine with and without aura groups. Interestingly, in the four players with a coexistent concussive brain injury, the headaches responded to the same drug, suggesting a common basis of symptom generation.

Although adverse events were common, they were relatively minor and did not prevent players from promptly returning to match play after treatment. Most players reported a response to the drug within 5–10 minutes, and subjectively did not experience any deterioration of athletic performance. There is a theoretical risk of exacerbating coronary vasospasm, potentiating cardiac arrhythmias, bowel ischaemia and cerebrovascular ischaemia. This was not observed, but clinicians need to be cautious about the use of triptans during strenuous exercise, especially in non-elite sportspeople.

This pilot open label trial suggests that sumatriptan nasal spray may be a valuable, effective, and convenient treatment of headache in professional sport. A randomised placebo controlled trial would be appropriate to confirm these preliminary results.

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