CASE REPORT

Benign paroxysmal positional vertigo (BPPV) diagnosis and treatment in an elite professional football (soccer) player

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SUMMARY

A 33-year-old male professional football player suffered from acute-onset dizziness following a lower limb soft tissue treatment in prone lying. Symptoms included spinning vertigo lasting for 30's, headache, visual vertigo and disorientation. Clinical examination of balance and vestibular systems confirmed a left posterior canalithiasis benign paroxysmal positional vertigo (BPPV) and excluded other central and peripheral causes of dizziness. Two cycles of a left Epley manoeuvre were performed. An Epley manoeuvre abolished the BPPV and negated the need for medication. The player was able to return to play without dizziness within 24 hours completely symptom free. BPPV can be successfully identified and treated in elite football players and they can see a return to training and games within 24 hours. There are no epidemiology studies for this group of elite athletes either male or female despite increased occupational risk factors.

Kerrigan *et al*¹ was a self-selected population which may lead to an overestimation of the prevalence in this age group; however, most participants did not perceive dizziness as something they suffered with, therefore making the 9% findings more likely accurate. Accurate diagnosis and treatment can potentially negate the use of medication, reduce associated persistent symptoms that may affect performance (eg, imbalance, disorientation, associated migraine, etc) and speed up return to play.⁹

This case study aims to evidence the diagnosis and effective treatment of a posterior canalithiasis BPPV in an elite professional football player and more importantly identify an area for epidemiological study where there is a potential increased occupational risk of BPPV to assist sports medical professionals in the identification and treatment of this common cause of dizziness in professional football (soccer).

BACKGROUND

Benign paroxysmal positional vertigo (BPPV) is a peripheral vestibular disorder affecting 9% of young adults aged between 18 and 35 years¹ and is characterised by brief episodes of rotatory vertigo associated with head movements and a positionally induced nystagmus.²

BPPV has been identified as having an increased prevalence with other conditions: 5%–27% traumatic brain injury/head trauma,^{3–4} 34% whiplash injury, 14% spinal cord injury, 30% postvestibular neuronitis, 30% Menieres disease, 30% ear infections and 5% migraine/childhood migraine.^{5–9} BPPV can also be mistaken for concussion in sport.¹⁰ The female to male ratio occurrence was 2:1 with Kerrigan *et al* reporting that 22% of the young adults who where identified as having BPPV also played football (soccer).¹ The high figure linking BPPV and football highlights a potential increased risk associated with this sport. Emphasis to date has been around concussion in football with BPPV^{3–4–11} as a secondary, not primary, problem.

There is currently no literature reporting the prevalence of BPPV in elite football, male or female, despite this group potentially having increased risks due to the requirements of the game, for example, repeated heading of the ball,¹¹ jolting movements, collision events, although not proved a causative link to BPPV to date unlike, head injury and concussion¹² and also 9% prevalence of BPPV in this age group.¹

CASE PRESENTATION

The player

The player was a 33-year-old man who played in defence for an English championship football club but had also played at Premier League and international levels. He was fit and well and had not suffered dizziness or vertigo symptoms prior to this episode. Medical history included cluster headaches and migraine with visual aura (although he had been symptom free for 2 years), childhood migraine and repeated bilateral ear infections as a child. He experienced 2 concussion events, 20 and 8 years ago, both times losing consciousness and feeling 'groggy' for a week afterwards but without dizziness or residual symptoms and resolving at 10 days. A head collision 5 years ago required stitches but was not associated with dizziness or concussion. He repeatedly headed balls due to his playing position. He had no positive answers to significant medical history questioning or special questions. He had glandular fever at the age of 20 years with full recovery, did not smoke, drink alcohol, take any medication or recreational drugs and he participated in daily training at the football club. He had no known drug allergies.

Aims/Goals

The players' aim was to be able to play football for his club and turn quickly, without disorientating dizziness or need for medication, as soon as possible.

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Table 1 Objective examination findings

Negative tests/Normal	Positive tests
Otoscopy and tinnitus screen	Dix-Hallpike left: upbeat, left rotational/ geotropic, latent, fatiguing (25 s) and habituating nystagmus
Cranial nerve examination	
Coordination of upper limb and lower limb	
Cervical spine Range of Movement pain free full active	
Gaze stability	
Vestibular-Ocular-Reflex cancellation	
Vestibular-OcularReflex repetition	
Halmaygi head thrust	
Tracking, smooth pursuit, convergence and divergence	
Skew eye deviation test	
Romberg	
Single-leg stance eyes open/closed	
Unterberger step test_ve modified clinical test of sensory interaction on balance (mCATSIB) score 120/120	
360° turn right and left	
Gait	
Dynamic visual acuity (one line discrepancy only)	
Dix-Hallpike right side	
Roll test right and left	

History of present condition and symptoms

The players main concern was momentary rotatory dizziness lasting no more than 30s associated with a ‘visual juddering’, disorientation and lightheadedness. This occurred when sitting up from lying, turning in bed (left to right) and fast head movements. He felt well in between with only a light disorientated feeling. Onset of symptoms started spontaneously a week prior to the specialist assessment when sitting up following a leg massage where he was required to lay prone for 20min. Since then, the symptoms had stayed the same with no change to aggravating and easing factors and was occurring four to five times a day depending on activity. No symptoms were apparent at rest. He had been prescribed cinnarizine 30mg by the club doctor but only took it once as he found he was too drowsy for daily activities.

INVESTIGATIONS

None in line with BPPV guidelines.²

Investigations would be appropriate, for example, if a downbeat nystagmus was present on Dix-Hallpike as in a rarely seen anterior canal BPPV (possible in this patient due to the position of onset but negated in this instance by positional testing (see table 1)). It would require further investigations as other conditions (eg, cerebellar pathologies) have a higher incidence of downbeat nystagmus.²

DIFFERENTIAL DIAGNOSIS

Vestibular assessment

An advanced vestibular physiotherapist independent prescriber performed an objective vestibular and balance assessment, and the results are displayed in table 1. Thorough examination is necessary to exclude other possible reasons for symptoms (eg, Menieres disease, labyrinthitis, vestibular migraine,

perilymphatic fistula and central causes, etc²) or need to investigate further.

Diagnosis

Left posterior canalithiasis BPPV:

cupulolithiasis was ruled out due to the duration of nystagmus on Dix-Hallpike.

Outcome measure

Dix-Hallpike test—left positive

TREATMENT

- ▶ 2 x Left Epley manoeuvre²;
- ▶ Post-Epley advice not to drive if dizzy.
- ▶ Recurrence rates and risk factors were discussed.
- ▶ Condition information leaflet was provided.
- ▶ Player monitoring.

Semont manoeuvre is as effective as an Epley²; it was not done in this case due to physiotherapist preference for positional head control and smaller body movements.

OUTCOME AND FOLLOW-UP

Symptoms resolved within 24 hours post-Epley and the player returned to training and matches 24 hours post-Epley.

Repeat Dix-Hallpike test—left negative (no nystagmus/ dizziness).

The player has reported no recurrence, dizzy symptoms or visual vertigo in the 12 months following treatment and has participated in all club training and matches other than when recovering from soft tissue injury.

DISCUSSION

This case study highlights the identification and successful treatment of left posterior canalithiasis in a professional football player. Correct diagnosis and treatment depends on identifying correct symptom characteristics. It highlights the role of the club doctors and physiotherapists who, with correct training and collective knowledge, can identify symptom characteristics and either treat at the club or refer onto an advanced practitioner vestibular physiotherapist or ear, nose and throat consultant for confirmation of the diagnosis and timely treatment. This player was assessed at the club without the use of infrared video goggles or Frenzel lenses; however, the nystagmus was clear and characteristic of posterior canalithiasis BPPV. If this was not the case, further investigation with this equipment is necessary as the ‘gold standard’ for accurate differential diagnosis.² An Epley manoeuvre was successful²; however, a Semont manoeuvre maybe preferable in some circumstances, for example, patient is unable to perform an Epley or therapists/doctors’ preference.²

There maybe an increased occupational risk of BPPV in football players due to the demands of the game, for example, repeated heading of a ball,¹² collisions, head injury,^{3 4 12} sharp acceleration/deceleration head movements^{11 12} and so on. It is also possible it could affect more female football players than male due to gender difference in occurrence rates.¹ It has been identified that repeated heading of a ball reduces cognitive function,¹² and although no causative link to date has been identified with heading a ball, this type of head movement and impact could also theoretically dislodge otoconia leading to an increased prevalence of BPPV alone in football players already hinted by Kerrigan *et al.*¹ This is an occupational risk that needs to be better understood for improved identification, timely treatment

of BPPV and informed consent for players participating in football.

Risk factors

The player has numerous risk factors for BPPV including head trauma, concussion, childhood and adult migraine and repeated ear infections, which are linked to increased incidence of BPPV.^{3–5 7 8} Knowledge of positionally induced nystagmus characteristics can lead to successful identification and differential diagnosis between concussion and BPPV, thereby avoiding return to play too soon reducing the risk of second impact syndrome. BPPV is not well identified in a young adult population¹ and epidemiological studies in professional football, either male or female, are non-existent despite real and potential increased occupational risk factors.^{3 4 11 12} This can mean that it is poorly recognised at a club level leading to prolonged episodes of dizziness and player absence.

Benefits

Education on condition recognition and its epidemiology in elite football will assist sports medical professionals and improve the

identification and treatment of BPPV in professional football where there is potential increased occupational risk. Return to play within 24 hours and no need for medication show the benefits of identifying this condition in professional football. There may also be performance benefits, for example, visual tracking and gaze stability following BPPV treatment, which have not yet been explored. Improved confidence in medical professionals and players will mean that they seek help more readily for dizziness without the fear of being sidelined.

Conclusion

Successful identification of BPPV in a professional football player can improve return to play time. Further epidemiological studies may highlight an increased prevalence of this condition in professional football players helping to guide and improve the assessment and treatment of players presenting with dizziness.

Contributors LB is the lead author and clinician for the case study. RP is the medical lead for Hull City FC and proofread the document, gained patient consent for publication and assisted with references.

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Patient's perspective

I was really worried about the dizziness in case it was something serious. The drugs made me feel drowsy and I only took them once because of that. I was wary about turning sharply and being disorientated in training or games. That could lead to a goal and a match loss, which could be the difference for championship promotion. After the assessment and treatment I felt miles better. I'd never heard of this type of problem, things rolling around my ears seemed weird but after treatment I was in training and matches within 24–48 hours and couldn't believe how quickly the dizziness went. I could train and play without dizziness. If the staff hadn't recognised this problem I could have been out of for a lot longer jeopardising my place in the team and our chance of promotion to the Premier League.

Learning points

- ▶ Benign paroxysmal positional vertigo can be successfully identified and treated in elite football players.
- ▶ Return to training and games in 24 hours
- ▶ Abolished need for medication
- ▶ There are no epidemiological studies in elite football players either male or female despite potential increased risks.

REFERENCES

- 1 Kerrigan M, Costigan M, Blatt K, *et al.* Prevalence of benign paroxysmal positional vertigo in the young adult population. *PMR* 2013;5:778–85.
- 2 Bhattacharyya N, Gubbels SP, Schwartz SR, *et al.* Clinical practise guidelines: benign paroxysmal positional vertigo (update). *Otolaryngol Head Neck Surg* 2017;156(3_suppl):S1–47.
- 3 Alsalaheen B, Mucha A, Morris L, *et al.* Vestibular rehabilitation for dizziness and balance disorders after concussion. *J Neurol Phys Ther* 2010;34:87–93.
- 4 Hoffer ME, Gottshall KR, Moore R, *et al.* Characterizing and treating dizziness after mild head trauma. *Otol Neurotol* 2004;25:135–8.
- 5 Karlberg M, Hall K, Nicole Q. What inner ear diseases cause benign paroxysmal positional vertigo? *Acta Otolaryng* 2000;120:380–5.
- 6 Lee WK, Koh SW, Wee SK. Benign paroxysmal positional vertigo in people with traumatic spinal cord injury: incidence, treatment efficacy and implications. *Am J Otolaryngol* 2012;33:723–30.
- 7 Neuhauser H, Lempert T. Vertigo and dizziness related to migraine: a diagnostic challenge. *Cephalalgia* 2004;24:83–91.
- 8 Ralli G, Atturo F, de Filippis C. Idiopathic benign paroxysmal vertigo in children, a migraine precursor. *Int J Pediatr Otorhinolaryngol* 2009;73 Suppl 1:S16–18.
- 9 Lau BC, Kontos AP, Collins MW, *et al.* Which on-field signs/symptoms predict protracted recovery from sport-related concussion among high school football players? *Am J Sports Med* 2011;39:2311–8.
- 10 Valovich McLeod TC, Hale TD. Vestibular and balance issues following sport-related concussion. *Brain Inj* 2015;29:pp175-184:175–84.
- 11 Stewart WF, Kim N, Ifrah CS, *et al.* Symptoms from repeated intentional and unintentional head impact in soccer players. *Neurol* 2017;88:901–8.
- 12 Shewchenko N, Withnall C, Keown M, *et al.* Heading in football. part 2: biomechanics of ball heading and head response. *BR J Sports Med* 2005;39(suppl 1):i26–32.

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