Commentary

Getting "a head" of the game – Cricket and brain injury

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Introduction

Concussion or sports related traumatic brain injury in elite level cricketers occurs relatively infrequently when compared to injury of other areas of the body [1]. Despite this, high profile incidents of cricketers attempting to "play through" a brain injury as well as retiring from the professional game as a result of persisting neuropsychiatric symptoms have been highlighted by the media [2, 3, 4, 5]. Given the less predictable nature and variable course of traumatic brain injury, prompt and comprehensive assessment by informed medical practitioners has come into greater focus. Cricketing authorities within the UK and Australia continue to prioritise the topic and provide information by way of modules and infographics to support players, coaches and medical personnel in order to manage acutely and minimise the risk of adverse longer term outcomes [6, 7, 8]. Thus, we consider significant recent publications and highlight some of the wider issues involving brain injury in cricketers.

Performance related measures

O'Halloran et al. present a useful performance analysis of elite level cricketers (batting and bowling averages) following a helmet/head strike [9]. Most notably, there was a significant decline in performance measures at 3 months in the study group not diagnosed with a concussive injury following impact. Added to this, the analysis gives further credence of difficulties faced in identification of behaviours suggestive of a brain injury by observation alone.

Performance related data have not been typically measured when considering sport related brain injury. Rather, the scientific community has tended to focus on data related to various methods of neuropsychological testing in order to describe symptomology and assess progress through return to play strategies. Focus on performance related factors is welcomed. It will contribute to a wider understanding and acceptance of sports related traumatic brain injury, particularly so from a players or coaching perspective.

Lower levels of cricket

Within the amateur game there is no recognised brain injury protocol that can be used by non-trained professionals. Thus players, umpires, coaches, family/friends and spectators should exercise caution with letting a batter continue their innings (or training) following head impact. A knowledge of first aid, potential "red flags" and onward basic self-care should be widespread and influence decision making in the minutes, hours, days and weeks following. This requires wide dissemination of information from cricketing authorities as well as a change of culture and approach towards batters who have been "hit". Added to this, cognisance of cricket related brain injury not being an injury solely of batters being hit on the helmet should be considered – mechanisms of injury involving wicketkeeping and fielders exist, for example colliding with each other or head contact with the ground or advertisement boards on the boundary edge [10].

Elite level cricket

In elite level cricket where there is greater availability to medical professionals, the recognition and management of brain injury continues to be a challenge. At present, there is no biomarker for brain injury and limitations of immediate or "on-field" examination exist. With livelihoods at stake, batters may want to play on following any impact and thus want to "beat" or hide symptoms from those

examining them. Insight into compromise of performance and long term sequela following brain injury may not be considered when in the middle of intense competition.

There can be variation between sports as to how the topic of brain injury is approached and managed, despite apparent multisport consensus [11]. As noted above [9], use of video is increasingly being considered as a way of aiding decision making in cricket, albeit with limitations. Descriptions of how various neurological symptomology may present following head impact have been attempted but agreed definitions have not been made thus far [12]. Furthermore, previous work within cricketing populations has suggested atypical presentation following impact [13]. To further complicate, symptoms and signs from brain injury can evolve and present sub-acute, which require evaluation at, as yet unspecified time periods. Data from the elite level game, including that of elite female cricketers, suggest up to 70% of diagnosed "concussions" can have a "delayed" presentation [10]. Self-report questionnaires are still relied upon within some of the main assessment tools [11, 14].

Law changes

At Test Match level there has been introduction of concussion replacements in order for teams not to be penalised for withdrawing a player suffering from or suspected as having a "concussion". This removes pressure on medical staff to make decisions quickly and likely lessens the likelihood of errors being made. The main cricketing administrations provide guidance and support for practitioners working within the field [8, 15, 16]. The Sports Concussion Assessment Tool Version 5 [11] cannot be carried out in less than 10 minutes and if carried out as recommended, could last up to 20 minutes in an optimal environment, allowing time for resolution of increased heart rate and "decompression" from the heat of competition.

Mandatory changing of a helmet following impact is now routine practice within the highest level of cricket. The purpose of this change of equipment should be made clear and not overlooked – in that the helmet is not necessarily protective of further brain injury. Furthermore, there is potential for increased risk of harm if helmet replacement is perceived by a batter to be part of a primary or secondary prevention strategy or indeed if symptoms have not become noticeable at the time of original assessment.

Mental illness in cricket

Mental health symptomology has been associated with head injury in other sports [17]. Longer term, there has been stark neurocognitive outcomes in ex-professional soccer players [18]. A smaller study but with similar methodology, of ex professional cricketers highlighted the lower rate of many chronic health conditions when compared to that of a matched general population [19]. None of the sample of 113 individuals reported a dementia syndrome. Somewhat surprisingly then, in this cohort of cricketers with better general physical health outcomes, anxiety and depression as diagnosed by a family physician was noted to have higher standardised mortality ratio when matched to the general population.

Disturbed sleep and anxiety/depression within elite cricket populations have been estimated [by way of self-report questionnaires] to be 38.4% and 37% respectively [20]. Such symptoms have been associated with prolonged recovery periods than expected, in those undergoing return to play protocols following sports related brain injury. At present clinicians treating those with a brain injury should be aware that reported mental illness symptomology could be associated with an exacerbation of pre-existing illness, a psychological response to the rehabilitation period or indeed a pure sequelae of brain injury for those affected. Perhaps even a combination of these. The importance of considering normal fluctuations in mental health should not be lost in this patient population [21].

Existing mental illness inquiry within the various post brain injury tools, endorsed by the leading cricketing administrations are inadequate in their present form. For example, within SCAT5 the patient will be asked to consider if they are experiencing symptoms "at this time" such as being "more emotional" and noticing "sadness". These self-report symptoms are combined with a variety of other symptoms (such as dizziness, blurred vision, balance problems etc) to give a total symptom score and severity score.

Baseline SCAT5 examinations undertaken in amateur club rugby union players has shown promise as a possible screening tool to identify mental illness albeit with limitations in terms of generalisability to other sports, uncertainty with regards relevance to head injury history and heterogeneity [22]. The authors suggest that any patient suffering from predominant mental health symptoms will be unlikely to be identified as a result of the questions posed, at as yet, unspecified time points or intervals. Added to this, isolated self-report questionnaires without a fuller explanation, assessment and onward management of psychological distress can be harmful and lead to inconsistent practice. Future versions of assessment should look to optimise this area with evidence based practices and provide closer guidance on return to play strategies from a psychological perspective. Those with a history of concussion, existing mental illness or deemed to be at high risk of brain injury may benefit from psychological prehabilitation albeit this would be without any empirical evidence base at present.

Conclusion

In summary, there are many factors influencing sports related brain injury, its diagnosis and management thereafter, with separate considerations for the amateur and elite level game of cricket. Use of video analysis will be an important aspect of the overall identification alongside existing methods of assessment, albeit with technology such as this unlikely to be forthcoming in lower levels of cricket. Thus, as knowledge base widens, dissemination of information related to brain injury throughout cricket should be prioritised moving forward and be to the forefront of education for not only medical professionals but the wider cricketing community. Mental health practitioners, be that sports psychiatrists, sports medics, neuropsychologists, clinical psychologists or otherwise, should be mindful of limitations within present assessment tools and understand the importance of a multidisciplinary approach in management of sports related brain injury in cricketing populations.

Key points

1. Measuring performance related data when considering brain injury in cricket may work towards changing misguided or uninformed attitudes to traumatic brain injury within the game.
2. Within existing practices, limitations exist with regards short and medium term identification of symptoms and assessment, particularly from a mental health perspective.
3. Resources to assist practitioners have been made available by the major cricketing administrations.
4. Clear distinctions between the amateur and professional game need to be made and should not necessarily influence each other.

References

1. Orchard JW, Kountouris A, Sims K. Incidence and prevalence of elite male cricket injuries using updated consensus definitions. Open Access J Sports Med. 2016;7:187–94.
2. Lavalette T. Steve Smith's concussion ignites debate over contentious cricket rules. Forbes Magazine. Available from: https://www.forbes.com/sites/tristanlavalette/2019/08/20/steve-smiths-concussion-ignites-debate-over-contentious-cricket-rules/?sh=3d62471f6286 (Accessed: October 9, 2022).
3. Friend N. Craig Overton replaced for Somerset after showing delayed concussion signs. TheCricketer. Available from: https://www.thecricketer.com/Topics/countycricket/craig_overton_replaced_somerset_after_showing_delayed_concussion_signs.html (Accessed: October 9th, 2022).
4. E.S.P.N. Harvey Hosein retires from cricket due to long-term concussion. ESPNcricinfo. Available from: https://www.espncricinfo.com/story/derbyshire-news-harvey-hosein-retires-from-cricket-due-to-long-term-concussion-1283803 (Accessed: October 9, 2022).
5. ABC News. Will Pucovski to take another period of indefinite leave from cricketABC News. Available from: https://www.abc.net.au/news/2022-10-27/will-pucovski-to-take-another-period-of-indefinite-leave-cricket/101585840 (Accessed: October 9, 2022).
6. ECB.co.uk. About concussion. Available from: https://www.ecb.co.uk/about/science-and-medicine/concussion-in-cricket (Accessed: October 9, 2022).
7. Cricket Australia. Policies & guidelines. MyCricket Community. Available from: https://www.community.cricket.com.au/clubs/protecting-your-club/policies-and-guidelines (Accessed: October 9, 2022).
8. Cricket Australia. Rules and regulations. Available from: https://www.cricketaustralia.com.au/cricket/rules-and-regulations (Accessed: October 9, 2022).
9. O'Halloran P, Goggins L, Peirce N. Observable player behaviours and playing performance following helmet strikes in elite cricket. BMJ Open Sport Exerc Med. 2021;7:e001128.
10. Hill T, Orchard J, Kountouris A. Incidence of concussion and head impacts in Australian elite-level male and female cricketers after head impact protocol modifications. Sports Health. 2019;11(2):180–5. https://doi.org/10.1177/1941738118811315
11. Sport concussion assessment tool - 5th edition. Br J Sports Med. 2017;51:851–8.
12. Davis GA, Makdissi M, Bloomfield P, Clifton P, Echemendia RJ, Falvey EC, et al. International consensus definitions of video signs of concussion in professional sports. Br J Sports Med. 2019;53(20):1264–7.
13. Whitehouse DP, Kelleher-Unger IR, Newcombe VFJ. Head injury and concussion in cricket: Incidence, current guidance, and implications of sports concussion literature. Transl Sports Med. 2021;4:319–26. https://doi.org/10.1002/tsm2.222
14. Covassin T, Elbin RJ 3rd, Stiller-Ostrowski JL, Kontos AP. Immediate post-concussion assessment and cognitive testing [ImPACT] practices of sports medicine professionals. J Athl Train. 2009;44(6):639–44.
15. ECB.co.uk. About concussion. Available from: https://www.ecb.co.uk/concussion-in-cricket (Accessed: October 9, 2022)
16. International Cricket Council. Concussion management guidelines. Available from: https://resources.pulse.icc-cricket.com/ICC/document/2021/01/21/28d8425f-cbc6-4101-b336-e567fdabc737/ICC-Concussion-Management-Guidelines-Dec-2020.pdf (Accessed: October 9, 2022).
17. Yrondi A, Brauge D, LeMen J, Arbus C, Pariente J. Depression and sports-related concussion: A systematic review. Presse Med. 2017;46(10):890–902.
18. Russell ER, Mackay DF, Stewart K, MacLean JA, Pell JP, Stewart W. Association of Field Position and career length with risk of neurodegenerative disease in male former professional soccer players. JAMA Neurol. 2021;78(9):1057–63.
19. Jones ME, Davies MAM, Leyland KM, et al. Osteoarthritis and other long-term health conditions in former elite cricketers. J Sci Med Sport. 2018;21:558–63.
20. Schuring N, Kerkhoffs G, Gray J, et al. The mental wellbeing of current and retired professional cricketers: an observational prospective cohort study. Phys Sportsmed. 2017;45(4):463–9.
21. Lundqvist C, Jederström M, Korhonen L, Timpka T. Nuances in key constructs need attention in research on mental health and psychiatric disorders in sports medicine. BMJ Open Sport Exerc Med. 2022;8:e001414.

22. Burger JW, Andersen LS, Joska JA. Baseline concussion assessments can identify mental disorders: SCAT-5 and other screening tools in South African club rugby. Phys Sportsmed. 2022;18:1–10.

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