
Neuroimaging Not Helpful in Sports Concussion Diagnosis



Results of a new study tend to support the prevalent opinion among physicians specialising in sports-related concussion (SRC) that neuroimaging is not that useful in diagnosing SRCs. Researchers from the Canada North Concussion Network in Manitoba examined neuroimaging studies in children and adolescents with SRCs and found that the images appeared normal in 78 percent of cases. The findings are reported in the *Journal of Neurosurgery: Pediatrics*.

"This study provides preliminary evidence that neuroimaging findings are normal in a significant proportion of paediatric sports-related concussion patients, but not every patient, and that neuroimaging can be helpful in informing clinical and return-to-play decision making in selected patients presenting with neurological symptoms following sports-related head injury," says lead author Michael J. Ellis, MD, of the Departments of Surgery, Paediatrics and Child Health, and Diagnostic Imaging and Section of Neurosurgery, University of Manitoba.

Dr. Ellis and colleagues reviewed neuroimaging findings in 151 patients (age 19 years or below) who had sustained SRCs during competitive sports activities such as hockey, baseball and soccer. The SRCs were all diagnosed and followed up by a single neurosurgeon specialising in concussion spectrum disorders at a multidisciplinary concussion programme in the Pan Am Clinic in Winnipeg, Manitoba, Canada, between 1 September 2013 and 31 July 2014. All cases were referrals from other doctors or athletic advisers.

Overall, 36 patients (24 percent of study population) underwent neuroimaging exams, the results of which were normal in 78 percent of cases. Sixteen percent of patients underwent computed tomography (CT) imaging (results were normal in 79 percent of cases), while 11 percent of patients underwent magnetic resonance imaging (MRI); results were normal in 75 percent of cases.

Abnormal CT findings included the following: arachnoid cyst (1 patient), skull fracture (2 patients), suspected intracranial haemorrhage (1 patient), and suspected haemorrhage into an arachnoid cyst (1 patient). Abnormal MRI findings included the following: intraparenchymal haemorrhage and sylvian fissure arachnoid cyst (1 patient); non-haemorrhagic contusion (1 patient); demyelinating disease (1 patient); and posterior fossa arachnoid cyst, cerebellar volume loss, and nonspecific changes in white matter (1 patient).

In the journal report, the researchers discuss the common use of CT scans, noting the risks that excessive exposure to radiation may pose for children and adolescents. Also, since CT scans yield no signs of traumatic injury to structures of the brain in most cases of SRC, Dr. Ellis et al. recommend that use of CT should be limited to the emergency room setting in evaluating acutely injured patients in whom clinical signs or symptoms suggest the possibility of skull fracture or intracranial haemorrhage.

While neuroimaging does not reveal pertinent findings in most SRC cases, the researchers stress "the need to consider MRI in paediatric patients with focal neurological deficits, worrisome symptoms, or abnormal or inconclusive CT findings," adding that MRI "should also be considered in paediatric patients with persistent symptoms for which the definition is unclear."

Dr. Ellis adds: "Methodologically, this study does not tell us which patients are more likely to demonstrate traumatic abnormalities on clinical neuroimaging, including magnetic resonance imaging. This question will be addressed by a prospective clinical study that is currently underway at our institution."

Source: [Journal of Neurosurgery](#)

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