

The Value of CT Scans for Children with Headaches

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ABSTRACT: We studied the value of CT scans for all children referred because of headache to one secondary and one tertiary pediatric centre during a 1 year period. Of 117 children who were seen by the Pediatric Neurology Service, at the I.W.K. Children's Hospital, 4 had CT scans and only 1 of these was abnormal. The consultant Pediatrician saw 40 children because of headache. CT scans were done on 3 of these patients and all were normal. None of the children who had a clinical assessment alone had unrecognized neurological disease during 20 months of follow-up. Therefore only 1 of 157 children had significant intracranial pathology. We conclude that CT scans have a limited role in the management of children with headache.

RÉSUMÉ: Intérêt du CT scan chez les enfants qui ont des céphalées Nous avons évalué l'intérêt du CT scan chez tous les enfants référés pour céphalées à un centre de soins pédiatriques secondaires et à un centre de soins tertiaires sur une période d'un an. Sur les 117 enfants qui ont été vus dans le service de neurologie pédiatrique de l'I.W.K. Children's Hospital, 4 ont eu un CT scan, dont un seul s'est avéré anormal. Le pédiatre consultant a vu 40 enfants pour céphalées. Un CT scan a été fait chez 3 de ces patients et tous étaient normaux. Aucun des enfants qui a eu une évaluation clinique seulement n'a manifesté une maladie neurologique, qui aurait été ignorée lors de cette évaluation, dans les 20 mois du suivi. Donc, il n'y avait qu'un enfant sur 157 qui avait une pathologie intracrânienne significative. Nous concluons que le CT scan a un rôle limité dans l'évaluation des enfants présentant des céphalées.

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Headaches are a common complaint in childhood. Approximately 55% of children have occasional headaches and a further 4% have migraine.¹

During the past decade the availability and public awareness of CT scans has increased substantially. In our experience there has been an increase in public demand for CT as part of the initial evaluation of the child with headaches. There is little data in the literature to guide the physician when deciding the value of routine CT in children with headaches.

Our study was designed to examine the use and value of CT scans in detecting significant abnormalities in children with headaches in Nova Scotia, Canada.

METHODS

The charts of all children consecutively referred for headaches, over a one year period, to one secondary and one tertiary pediatric centre were reviewed.

All patients seen by the 2 pediatric neurologists, during the 1 year period, at the IWK Children's Hospital (IWK), the only tertiary pediatric centre for the Province of Nova Scotia, were studied. The review was restricted to clinics attended by a pediatric neurologist alone for 2 reasons. First this more closely resembles the office practice of physicians, and second our database is not complete for resident attended clinics. All headache refer-

als, during the same time, to the only Pediatrician at the Colchester Regional Hospital (CRH), the secondary centre, were also reviewed. More than 90% of children seen at the IWK and all those seen at the CRH were referred directly by family physicians. The diagnosis for every patient was coded and entered into our database following each office visit. Patients were identified through this database.

The CT scan records at the CRH were studied to find all children who had CT scans because of headache during the same time period.

RESULTS

During the period of study 117 children were referred because of headache to the Pediatric Neurology service at the IWK Children's Hospital. Of these 40% had common migraine, 29% had tension headaches, 22% had classical migraine and 3% had complicated migraine. The remaining 6% had headaches which did not fit into a clearly defined diagnostic group, although the children were neurologically normal. Forty children were seen by the pediatrician in Colchester County. It is not known how many children with headaches were seen by family physicians during the same period.

Of those patients seen by a pediatric neurologist only 4 had CT scans. The remaining 113 children had a complete clinical

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neurological assessment but underwent no investigations. Of the 4 who had CT scans, 2 were done because of parental anxiety although the children clearly had stress related headaches. Both had normal scans and the headaches resolved.

The third patient was a 15 year old boy who was seen because of a 7 week history of headaches. The headaches were located over the occiput and neck, with radiation to the shoulders. On examination he had limited neck flexion but no evidence of increased intracranial pressure or other neurological deficits. A CT scan showed a dilated left lateral ventricle. The headaches resolved spontaneously over the next week and a repeat CT scan 3 months later, when he was asymptomatic and neurologically normal, was unchanged.

The fourth child, a 2½ year old boy, was seen because of headaches which were compatible with migraine, using the criteria proposed by Prensky.² They were associated with vomiting, lethargy and relief following a period of sleep. The family history was positive for migraine. The parents did report, however, that his eyes tended to deviate downward during the headaches. His examination was normal. An initial diagnosis of migraine was made but as he had 4 similar headaches over the subsequent 3 months a CT was arranged and showed a choroid plexus papilloma. Following surgery he has done well.

Among the 40 children seen by the pediatrician at CRH, 29 (72.5%) had tension headaches, 6 (15%) had common migraine, 3 (7.5%) had classical migraine and 2 (5%) had headaches associated with acute sinusitis. Only 3 patients had CT scans. One had stress headaches but underwent scanning because of parental anxiety. The second also had tension headaches but in addition had a fever of unknown etiology. His scan was normal and his headaches resolved when his parents replaced his lost puppy. The third child had obvious anxiety related headaches but had a skull X-ray (SXR) as part of his family doctor's routine evaluation of such patients. The SXR was interpreted as showing an enlarged sella turcica but the subsequent CT scan was normal and the child has done well.

During the same year 34 children had CT scans ordered by family physicians at the CRH because of headaches. All of these scans were normal.

The IWK Children's Hospital serves as the only tertiary pediatric centre for the province of Nova Scotia. Therefore any child with significant neurological disease is seen by either the neurology or neurosurgery services at the IWK. No child who presented with headaches during the study period subsequently returned with previously unrecognized neurological disease during the 20 months since completion of the study.

DISCUSSION

Many physicians feel uncomfortable when dealing with headaches in children. This anxiety, coupled with parental concern about the headaches, may influence the judgment regarding the need for a CT scan.

In the past EEGs and skull X-rays were often performed on children with headaches. Prensky and Sommer found that only 17 of 64 children with migraine had a normal EEG.³ In addition "most" of the 84 children in his study had SXRs, all of which were normal.³

The EEG and SXR have largely been replaced by the CT when investigating headaches. The value of CT in studying children

with headaches has received little attention in the literature.⁴ In one study of 435 adult patients with classic migraine only one had an abnormal CT scan.⁵ Nonetheless some current standard neurology texts favour performing CT scans on children with tension headaches.⁶

Physicians feel reassured when the CT is reported as normal. Occasionally this leads to a false sense of security as intracranial tumours may be missed if the CT is done too early in the clinical course.⁷

Combining the experience of the pediatric neurologists and consultant pediatrician only 1 of 157 children routinely referred for headache had significant intracranial pathology. Only 7 of our 157 patients, including the only child with a brain tumour, had CT scans. Therefore 1 of our 7 CT scans yielded a positive result. All 34 CTs ordered by family doctors were normal.

Because of the regional nature of our health system we are sure that of the 150 children who did not have a CT scan, none had a progressive neurological problem that was undetected by our initial clinical evaluation.

We have previously suggested criteria for helping the physician to decide who needs a CT.⁸ Adherence to such guidelines will allow a more rational decision to be made when faced by a child with headaches. In our practice a CT scan is ordered for a child with headaches if any of the following are present: 1. an accompanying change in personality; 2. most of the headaches occur at night or during the early morning; 3. the headaches do not fit a recognized pattern (e.g. stress induced headaches or migraine); 4. complicated migraine; or 5. neurological abnormalities on examination.

Physicians must be economically responsible in the utilization of health care resources. Although the quality of patient care is the physician's priority, this must be balanced against the cost effectiveness of any investigation.

We conclude that CT scans are rarely of value when assessing children with headaches. The most important aspect of the evaluation is a thorough history and physical examination.

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