

Does a recent outside CT Head scan need urgent Radiologist review?

Flora Jevons¹, Manu Gadde², Iwan Roberts³, Rum Thomas²

¹University of Sheffield Medical School, Beech Hill Rd, Sheffield S10 2RX

²Paediatric Critical Care Unit and ³Department of Radiology, Sheffield Children's Hospital S10 2TH



a. CT head image from 2012 shows diffuse loss of grey-white matter differentiation (due to severe hypoxic-ischaemic insult). The study was reported as normal at the outside hospital and the case was a **serious incident**.

BACKGROUND: Paediatric intensivists perceive that specialist paediatric radiology review of outside CT scans may generate important new findings for critically ill/ injured children from an experience in 2012, when an outside scan report failed to identify a major abnormality (image a).

This audit was triggered by a late-night request for urgent review of an outside CT head scan (on a patient due to be transferred in). The scan was reported as normal at the District General Hospital and on later review at Sheffield Children's Hospital (SCH).

AIMS/OBJECTIVES: To identify evidence to support urgent review of external CT head scans that have been reported externally.

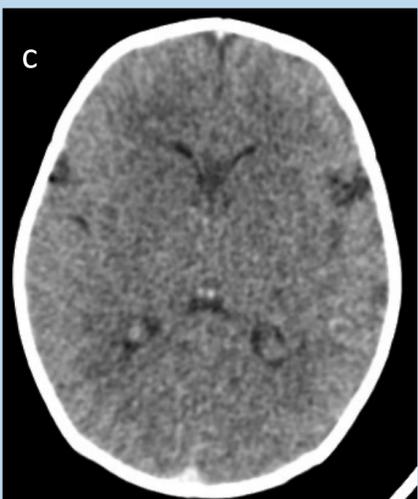
METHOD: The Radiology RIS/PACS system identified patients transferred into the Paediatric Critical Care Unit during 2020 with a recent external CT head scan. Images were reviewed and internal/external reports compared.



b. Another CT head scan for comparison with image a - the grey-white matter differentiation is clearly visible. (Can you see why scan b was done?) (Right sided skull #. You cannot see the # on brain windows.)

RESULTS:

- 44 patients were identified and 40 external CT head reports were available.
- One discrepancy was identified – subtle loss of grey-white matter differentiation in a 3-day old infant, not identified at the referring hospital (image c). Care was withdrawn within a few hours of the patient reaching the unit. Patient management would not have been altered in this case.
- Interpretation of neonatal head CTs can be difficult - the abnormality identified in case c was subtle.
- Different scanners/manufacturers have differing image appearances (one of our local hospitals has normal images that can mimic poor grey-white differentiation).
- SCH presents the diagnostic axial brain images first; other hospitals supply them in a different order with thin section images first (used for reconstructions).
- A normal CT head scan does not mean the patient has a normal brain.



c. 3 day old term infant, uncomplicated pregnancy, consanguineous parents. Admitted with shock, severe metabolic acidosis, and hyperammonemia. Reported as normal at the referring hospital. SCH report – diffuse loss of grey-white matter differentiation – suggests toxic or metabolic abnormality. Diagnosis – N-acetylglutamate synthase deficiency.

CONCLUSIONS:

There is no clear evidence to support ongoing urgent review of outside CT head scans - the exception being if clinical review of the patient is thought to contradict the external report.

Our study size is small and other discrepancies could well have occurred between 2012 and 2020.