Urgent Neuroradiology Requests from Eye Casualty: What is the Diagnostic Yield?

Sunderland Eye Infirmary

South Tyneside and Sunderland NHS Foundation Trust

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1. Introduction

- In the United Kingdom, the emergency eye department (EED) annual attendance rate is estimated to be 31 per 1000 for new patients[1].
- Many common presentations to EED, such as bilateral disc swelling, Horner's syndrome and third nerve palsy, require urgent neuroradiological imaging to exclude intracranial pathology
- Clinicians must combine history, examination and investigation findings to guide further assessment. However, the proportion of positive scans per indication is unknown and so risk stratification is challenging
- We believe that understanding the diagnostic yield of imaging requests for any given indication would enable clinicians to risk stratify and counsel patients prior to arranging imaging.

2. Objectives

1. Quantify the proportion of attendees to EED requiring urgent neuroimaging (completed the same day or next day)
2. Quantify the proportion of positive scans requiring neurosurgical input
3. Evaluate the local service at Sunderland Eye Infirmary and develop a new pathway for urgent neuroradiology requests

3. Methods

Study Registration	Registered as an audit locally by the Clinical Effectiveness Team at South Tyneside and Sunderland NHS Foundation Trust
Study Period	1st January 2021 – 19th June 2022
Data Collection	Retrospective data collection of all cases to include: patient demographics and medical information, indication for scan, results and follow up

4. Results

- 21940 patients attended EED during the study period, 113 of whom (0.52%, 6.4 per month) had urgent neuroradiology scans completed
- 18 scans (16%) were positive and required urgent neurosurgical handover
- The most common indications for scans were papilloedema (N=59, 21% positive), third cranial nerve palsy (N=20, 14% positive) and painful Horner's Syndrome (N=5, 40% positive).

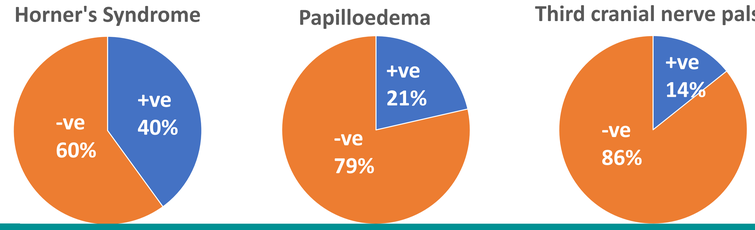
Table 1: Urgent neuroradiology requests by indication

	Total scans	% of all scans
Papilloedema	59	52
3rd Cranial Nerve Palsy	20	18
Painful Horner's Syndrome	5	4
Other indications	29	26
Total	113	

- The diagnostic yield of scans varied depending on the indication:

Table 2: Diagnostic yield by indication

Indication	Total Scans	Total positive	% positive
Papilloedema	59	12	21
3rd Cranial Nerve Palsy	20	3	14
Painful Horner's Syndrome	5	2	40
Other indications	29	10	34
Total	113		



5. Discussion

- A significant proportion (16%) of the scans were positive, which reflects the high diagnostic yield of neuroradiology requests from the ophthalmology department.
- The figures in this report are comparable to those in the literature:
  - A similar report carried out by the Bolton Hospitals NHS Trust found that 0.32% of presentations to eye casualty had urgent neuroradiological scans[2].
- Furthermore, research into neuroradiological test pathways supports the development of clear guidelines for improving not only patient outcomes but also departmental efficiency[3].
- Further research could include analysis of the diagnostic yield of imaging requests made by clinicians of varied levels of experience

6. Conclusion

- Urgent neuroradiology requests from the eye emergency department have a high diagnostic yield (16%)
- The diagnostic yield of urgent neuroradiology requests from the eye emergency department varies depending on the indication (14% - 40%)
- Knowledge of the diagnostic yield per indication allows clinicians to risk stratify and counsel patients when making neuroradiology requests.
- This audit made recommendations to the local trust and a new imaging pathway for patients with suspected underlying neurosurgical pathology was created.

References: [1] De Silva, I., Thomas, M.G., Shirodkar, Al. *et al.* Patterns of attendances to the hospital emergency eye care service: a multicentre study in England. *Eye* **36**, 2304–2311 (2022). https://doi.org/10.1038/s41433-021-01849-8, [2] Mathews JP, Mathews D, Walker S, Tuck J, Kelly SP. Can ophthalmic requests for neuroimaging be improved? Eye (Lond). 2004 Mar;18(3):290-2. doi: 10.1038/sj.eye.6700627. PMID: 15004579, [3] Martins R, Raimundo P, Alves P, Monteiro R, Silva LD, Gomes A, Afonso G. Appropriateness of Radiology Test Requests by an Emergency Department: A Retrospective Study. Acta Med Port. 2020 Jan 3;33(1):7-14. doi: 10.20344/amp.12075. Epub 2020 Jan 3. PMID: 31928599.