Optic foramina radiography – a redundant investigation?

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Abstract

A retrospective study of all plain radiographs taken of optic foramina during the six years 1984–9 inclusive, comprising a total of 318 examinations, was carried out in order to determine the role of this investigation in patients with ophthalmic disorders. All but one of the radiographs were reported as showing no abnormality. However, for this exception, review of the radiographs showed that the optic foramina were asymmetrical but fell within the normal range. This study indicates that plain radiographs of the optic foramina have little or no useful function. Abandoning the use of these views as a routine will result both in a reduction in radiation hazard and in considerable financial saving.

Since 1924, when views of the optic foramina were first described,¹ many ophthalmologists have considered plain radiographs of the optic foramina to be an essential part of the radiological examination of the ophthalmic patient.² Optic nerve glioma,³ meningioma,⁴ neurofibroma,⁵ and ophthalmic artery aneurysm⁶ are all known to produce enlargement of the optic canal. Bony abnormalities of the optic canal are seen in Paget's disease,⁷ fibrous dysplasia,⁷ metastases, and trauma.⁸

The optimal positioning of the head required to obtain these views is complicated, time consuming, and requires skilled staff. Repeat views are often required to obtain satisfactory results. The radiation dose is 1–2 cGy,⁹ and the cost in our centre of each examination is £35. Computed tomography (CT) and magnetic resonance imaging (MRI) produce images of very high quality, and neurologists and neuro-ophthalmologists rarely rely on plain radiographs.¹⁰ In a recent study not one of 174 consecutive optic foramina views was found to contribute significantly to patient management.¹¹ We have reviewed all the optic foramina views taken during a six-year period in order to determine the role (if any) of plain radiographs of the optic foramina in patient management in general ophthalmic practice.

Material and methods

A retrospective audit was performed on all requests to the x ray Department of the Western Infirmary, Glasgow, for x rays of optic foramina over the six years 1984–9 inclusive. This department provides a radiological service for the Eye Infirmary, Glasgow, and the Tennent Institute of Ophthalmology. During the period of study all requests had been accepted without radiological vetting. The clinical indications for this examination were recorded. The result of each examination and the findings of any other imaging procedures carried out on each patient were noted. The numbers of requests for each of the years studied were determined.

Results

A total of 318 radiological investigations were requested during the study period. All requests came from ophthalmologists. The clinical indications stated on the request cards are summarised in Table 1. Optic foramina views alone were requested in seven cases (2%). Two hundred and ninety-two (92%) of the cards requested radiographs of the skull in addition to views of the optic foramina. Requests were received for x rays of the orbits and optic foramina in 17 cases (5%) and for paranasal sinuses and optic foramina in two cases (0.6%).

Nine (2.8%) of the optic foramina views had been regarded as suboptimal for diagnosis, largely on account of excessive pneumatisation of the adjacent air sinuses. Asymmetry of the optic foramina was observed in 19 (6%) examinations, but these were deemed to have fallen within normal limits. Not one of the 318 examination of the optic foramina was considered abnormal. However, in 19 of the 292 (6%) lateral skull views which were obtained an abnormal pituitary fossa was described, but subsequent evaluation by computed tomography demonstrated a pituitary mass in only one of these cases. Other abnormalities of the skull radiographs were deemed to be incidental to the ophthalmic problem, for example, frontal mucocoele and pansinusitis. Five of the 17 orbital radiographs were abnormal. Computed tomography confirmed an orbital soft tissue mass in one case, and incidentally an aneurysm of the anterior communicating artery was identified in one other. Pansinusitis was present in one of the two examinations of the paranasal sinuses. Figure 1 shows that during the six-year period there was a significant reduction in the number for requests of optic foramina views.

Discussion

None of 318 optic foramina views requested

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Table 1 Indications for optic foramina view requests

Indication	Number	%
Visual disturbance	140	44
Optic atrophy	51	16
Pain/headache	35	11
Cupped/swollen discs	25	8
Proptosis	16	5
Low tension glaucoma	13	4
Trauma	10	3
Others	28	9
Total	318	100

Figure 1 Number of optic foramina views requested during each year between 1984 and 1989.

provided useful diagnostic information. Even when the additional views of the skull, orbits, and sinuses are considered, in the majority of cases these x rays provided little or no diagnostic information. The single case in which a pituitary tumour was identified had shown clinical evidence of bitemporal hemianopia, and a CT or MR examination would now be considered the principal investigation of choice in such a case. The falling number of requests for optic foramina views during the study period indicates that clinicians are recognising the futility of this investigation when compressive optic neuropathy is suspected.

Visual loss in one eye due to an isolated optic canal lesion without concomitant manifest pathology is extremely rare.¹² In a prospective study of 174 consecutive patients Moseley¹¹ identified seven cases in which the optical canal views

were interpreted as definitively or equivocally abnormal, but in no case were these views deemed to contribute to patient management. It has been argued that tomographic studies of the optic canal may be indicated in the rare case of suspected nerve meningioma which has not been identified by means of CT¹³ or nowadays magnetic resonance imaging.

In the present study there was one false positive investigation, but there were no true positive identifications of pathology out of 318 examinations. Our results confirm those of Moseley¹¹ and indicate that there is little or no place for optic foramina views in current ophthalmic practice except perhaps for cases in which pathology of bone is thought to be resulting in optic nerve compression.

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