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The Usefulness of Computerized Tomography (CT) in the Detection of Orbital Tumours

Przydatność tomografii komputerowej (TK) w wykrywaniu guzów oczodołu

Пригодность компъютерной томмографии (КТ) в выявлении опухолей глазницы

INTRODUCTION

On the basis of literature data and our own observations it is revealed that a high agreement between the radiological results and the final clinical diagnosis should be obtained only on the way based on a good cooperation between the radiologist and clinicians (10, 19).

In most cases, the diagnosis of space-occupying lesions of the eyeball can be made by CT and by ultrasonography. The second one is more accurate with regard to etiology and also has important advantage of not irradiating the lens. For tumours involving the eyeball and extending posteriorly within the orbit or optic nerve, both techniques are available, but CT images are more precise. For tumours which may grow intracranially, by tumoral extension or metastatic process, CT is the only noninvasive method which demonstrates such processes (2). Orbital CT scanning with third generation apparatus may give good diagnostic results provided that a tridimensional study has been performed, the postcontrast coronal sections and sagittal reformations being the more informative (22).

MATERIAL AND METHOD

Over a one year period (September 1986 – September 1987) we performed 3000 CT scans using a third generation apparatus Somatom DRH3 (Siemens). Among them thirty-nine patients of exophthalmos were originally subjected to the orbital CT investigation because of suspected tumours. There were 17 females and 22 males with mean age of 49 years.

Generally a basic orbital examination is performed by using axial sections, parallel to the

orbitomeatal line from the orbital floor to the roof (3, 6). We have started with a set of 4 mm thick sections which are the most suitable. All sections have been viewed on a display console by direct enlargement on a 512 × 512 matrix.

For axial orbital scanning the patients were examined in supine position with the head slighty hyperextended. The use of coronal scans obtained by third generation scanners is particularly valuable in ophthalmology since it provides much better visualisation of several structures that are not seen on the standard axial scans of the orbit. The patient is placed in the supine position with his head hyperextended. The gantry is then tilted 25° caudally in order to obtain scanning plane perpendicular to the orbitomeatal line. Generally, we are using 8 mm thick slices. When the scans are being made, it is helpful when the patients keep their eyes closed and look upwards as to prevent any moving of the ocular globe.

In order to receive a better visualisation of the different intra-orbital structure and notably pre-sellar and sellar regions, it is recommended to carry on the scans after an intravenous administration of contrast medium (19, 20). For this purposes we administered intravenously Uropolinum 60% when necessary in the standard dose of 2 ml per each kg of the patient's weight. In very exceptional cases, a sub-arachnoidal injection of Metrizamide in dose of 7 ml is recommended (10). When the evaluation of bone structure is required, the administration of Metrizamide is not necessary (1). The use of slices reformation according to the optic nerve direction, or to the orbital cavity axis and directions perpendicular to those, is recommended, to achieve a correct image not only of a nerve but also of the orbital muscular cone and the bone walls (1, 6, 10).

TUMOURS OF THE EYEBALL

The clinical examination should be performed before the other complementary examinations because the majority of eyeball pathology can be diagnosed by fundoscopy and ultrasound (18, 21). CT imaging can be helpful in case of lenticular or vitreous opacity as well as for the evaluation of retrobulbar or intracranial growth of a known lesion.

The two common primary tumours of the eye are malignant melanoma and retinoblastoma. The first one arises in the choroid, affects patients in their 50s and 60s but occasionally even younger ones (10). In early stages of its development, melanoma is characterized by variable thickness of the rim of the ocular bulb. In large tumours, the lesion may be irregular and fill the entire orbit (20).

CT manifestation of melanoma is an irregular expansion of the dense outer layer of the globe, bulging towards the vitreous. The density of the lesion is in the same range as the adjacent normal portion of the wall of the globe (Fig. 1). After intravenous contrast medium administration a definite enhancement can be noted. The main interest in CT examination is in the identification even asymptomatic, of cerebral localization. Of course CT turns out to be indispensable when the fundoscopy is impossible (7). Malignant melanoma needs to be differentiated from: metastatic carcinoma, haemangioma and subretinal hemorrhage.

Retinoblastoma is diagnosed before the age of three, often bilateral (30%) and is the most common malignant lesion of childhood (10). About 34% of patients have multiple indipendent foci of tumour within an eye. Finding of calcification

in one eye before the age of three is sufficient for diagnosis because in 87% of the cases calcifications are revealed histologically (20).

The interest in CT investigation is in delineating the retro-bulbar extent of tumours and determining optic nerve involvement or intra-cranial spreading (20). The endocranic diffusion usually takes place at parasellar and pineal level (7). CT characteristics of the eyeball lesion are intraocular hyperdensity with basic density values which intermediate between those of the vitreous and those of the wall, and its enhancement after contrast medium administration. It is often possible to discover evident, irregular, hyperdensity areas referring to calcifications (10, 20).

Reticuloblastoma should be differentated from: haemorrhage, melanoma, choroidal angioma, retinal tumours, phacomatosis and parasitic calcifications. The differential diagnosis is not possible if based only on CT data (16, 20).

Ocular metastases are most common in the posterior choroidal near the macula, on the temporal side, because there occurs an increased vascularity. They originate generally in the breast, less frequently in the lungs or gastrointestinal system (10, 19). CT scan reveals them as thickened areas with increased basic enhancement.

Astrocytic hamartomas or astrocytomas of the retine are difinitely very rare and their CT aspect is similar to other lesion like tuberous sclerosis or Recklinghausen disease (20). Calcification within the lesion or complete calcification of the lesion itself is frequent (17, 20). Choroidal calcification in young women may be due to the presence of osteoma. Differential diagnosis is to be done with: melanoma, metastases, hemangioendothelioma or hemangiomas which may calcify.

THE OPTIC NERVE TUMOURS

Simultaneous visualization of orbital and intracranial soft tissues changes as well as bony changes in the optic canal allow the localization and identification of the majority of optic nerve lesion, based also on clinical data (20, 21). High resolution evaluation of the optic nerve requires special examination method, mainly based on computer reformations (4).

The two most common primary tumours of the optic nerve are glioma and meningioma. The first one is most often found in childhood but sometimes occurs in adult people. They have an incidence of 80% in the first decade of life, more commonly in girls and they represent 3% of the orbital tumours (10). They may extent posteriorly to involve the optic tracts and may reach the lateral geniculate body. The tumour may occur in any location along the optic pathway, with involvement of chiasm with one or both nerves (9).

Their growth can be nodular or infiltrative. The growth of gliomas at optic

nerve level presents two characteristic aspects: a circumferential perineural growth pattern and an expansive intraneural pattern.

At CT, in the early stage of growth, the tumour may appear as a small fusiform enlargement of the nerve (19). Later on the tumour shows a homogeneous widening of the entire optic nerve. The eccentric growth, which may be found in later stage, gives pictures of an eccentric mass, more or less regular, sometimes lobulated, roundish, starting from the nerve which is thickened and not separated from the mass (Fig. 2). In any case the basic density is just a bit higher than the normal optic nerve one, and shows a light enhancement (5). One of the most important aspects of CT is the detection of the glioma endocranic extension. The chiasmatic extension of the optic nerves gliomas must be distinquished from gliomas of hypothalamic region, which are more invasive, and sensitive to unnoticed at a basic CT investigation and for this reason it is necessary to perform the Metrizamide cisternography (10, 20). Differential diagnosis is to be done with: optic nerve sheath meningioma, neurilemmoma and cavernous hemangioma.

Optic nerve sheath meningiomas represent less than 20% of optic nerve tumours (10). They occur predominantly in adults, mainly women and they are seldom bilateral. They may evolve exophitically or endoophitically along the optic nerve sheaths. Calcification may be visible on the surface or in the psammomma bodies. At the optic canal level there are bony alterations, consisting of canal enlargement, changes in contour and focal areas of hyperostosis which are specific for meningioma (10, 19, 20).

At CT there is usually diffuse thickening of the optic nerve. High resolution CT often allows the visualization of the normal optic nerve running through the tumour which is relatively hyperdense with enhancement after contrast medium administration. Optic canal widening can be showed with typical hyperostosis. This finding can help to distinquish meningioma from glioma. Finding of a big nerve, without enhancement, must always lead to thinking of a possibility of intracranial meningioma (20). Whenever CT investigation does not show the tumour, even if carried out with contrast medium administration, it is necessary to resort to subarachnoid contrast medium injection, trying to display its passage within the optic nerve sheaths. The ability of CT to detect meningiomas makes it the only most important diagnostic procedure (11). In some cases meningiomas present at CT irregular punctiform, clod-shaped, psammomatous calcifications (Fig. 3).

Malignant melanomas are rare and can arise from tissues within the anterior portion of the optic nerve, revealing at CT a thickened nerve with increased density. Other primary tumours and fibromas of the optic nerve are also rare and it is impossible to distinquish them from other tumoral forms (19, 20). Metastases may infiltrate the optic nerve commonly at canal level and CT detects a specific, irregular thickening with increased density and enhancement (9, 10, 26). In

differential diagnosis we have to take into consideration the following diseases: intracranial hypertension with resulting papilledema, optic neuritis, acute central retinal vein occlusion, limphomatous and leukemic infiltration of the optic nerves, hemangioblastoma, sarcoidosis advanced Grave's disease and optic nerve sheath hemorrhagia (10, 12, 26).

TUMOURS OF EXTRAOCULAR MUSCLES

Neoplastic disease of extraocular muscles may be primary or secondary. The CT observation of the patterns of muscles involvement, their shape, density and enhancement, the compromission of the non-muscular tissues, of the orbit can lead sometimes to differential diagnosis but up to now no radiographic finding in itself seems to be pathognomonic. Only appriopriate information on clinical findings allow correct and reliable diagnostic hypothesis (17).

The rabdomyomas are benign tumours of the strated muscle and their orbital localizations are very rare. The rabdomyosarcoma is most malignant among the infantile tumours, and most common in the primitives of the orbit in childhood (25, 26). CT shows an infiltrating lesion a hyperdence with sharp enhancement (Fig. 4). Orbital walls are eroded and cerebral metastases are often evident. During radiotherapy calcification have been noted.

Muscular localization of limphomas is usually part of systemic diseases rather than primary lesion of the orbit. They appear as homogeneous high density masses marked enhancement. It is difficult to distinquish the real limphomas from the limphomatous infiltrations in pseudotumour, without resorting to the precious help of immunopathological tests (6, 10).

Histiocytosis X affects in its more severe form the youth and usually alterations of bony structure of the orbital wall are found bilaterally at CT (20).

Metastases do not alterate the muscular structure but provoke its aspecific enlargement or a density increase with enhancement. The involvement of the cone muscles has been noted in haemangiopericitomas. At CT these lesions do not have a definite limit with the adjacent muscles and the enhancement is not homogeneous but intense (10).

TUMOURS OF THE LACRIMAL GLAND

An increase in volume of the gland is aspecific and may indicate a tumour as well as an inflammatory lesion. Echogryphy gives additional elements for diagnosis of the tissue (21). The lacrimal gland tumours have a slow course and as a rule the adjacent bone altered. There is some per cent of limphomas, carcinomas and mixed tumours among them. All of them show similar macroscopic

anatomopathological and clinical features. Direct or reformed coronal sections in addition to axial section are very important when using the CT. The CT appearance may suggest specific pathologic diagnosis but the definite diagnosis is hystologic (Fig. 5). Differential diagnosis of benign and malignant tumour or dacryoadenitis is impossible so far. The possible association of an orbital volume increase or an erosion of the lacrimal fossa: suggests a tumour. The erosion of the external angle of the orbital roof is more regular and constant in mixed tumours whereas in carcinomas it is more irregular and variable. Density is roughly homogeneous, the enhancement is irregular, minimal when cystic components associated with mixed tumours have been assessed (10, 11, 20). Dermoid cysts show a content of negative density, but not all dermoids contain fat in such degree as to make them less dense than the normal orbital fat. Carcinomas may demonstrate definite enhancement but not always poor-definite margins (24). Limphomas have quite a homogeneous density and involve muscular cone structures in their inner parts. The bony alteration is rare and occurs in very advanced cases (7).

In the primary amyloid tumour there are CT signs similar to those of the orbital angioma. The secondary involvement of the lacrimal gland lesion is possible in case of metastasis deriving from continuity or distant diffusion relatively frequent in mammary tumours (10, 16, 20).

TUMOURS OF THE BONY ORBIT

CT easily allows biometric investigation since direct measurements can be done. Orbital enlargement is usually due to an intraorbital expanding lesion. The seat of the expansive lesion may cause a localized deformity and usually tumours outside the muscle cone cause an asymmetric enlargement with deformity of orbital walls (20).

Epidermoid tumours are choristomas which usually spread in the upper--external angle of the orbit, or near a suture. They are cysts containing cholesterol. The CT examination detects large areas of bony destruction with sharp and sometimes lobulated borders and marginal hyperdensity caused by sclerosis. Dermoid cysts are similar to the previous ones, even though their content has more irregular density because of additional structures mixed with fat (Fig. 6). The cystic centre is almost always of low absorption (10). The rim of the cyst may enhance with contrast. Many dermoid cysts cause benign bone expansion of the lateral and superior orbital walls. They are most commonly found along the supraorbital rim, and therefore belong to the differential diagnosis of lacrimal gland (23, 24, 25).

Aneurysmal bone cyst is a growth of the bone which appears "blown" with thinned walls and well marked borders (20). Osteoma may have a compact or

mixed structure and is shown as a well circumscribed high density expanding lesion within paranasal sinuses. The development is very slow. In case of nasopharyngeal fibromass orbital manifestations are very rare and they occur only in case of huge development (10, 25).

Well circumscribed areas of bone thickening and increased density correspond to the osteo-meningioma especially at sphenoid level. At CT scans it is possible to detect an extension of the tumoral mass towards the orbit, intracranially in the middle and anterior fossa and extracranially in the temporal fossa. Rapid increase in volume in case of exostosis with non-homogeneous bony density is a malignant sign, as occurs in Ewning's sarcoma in orbital localization or osteosarcoma. In the first case the thickening is anarchic with cortical bone break and development in the surrounding soft tissues. In the second case there is a region of irregular osteolysis and in both a very evident enhancement irregular in limits and denisty (2, 4, 6, 10, 20).

Metastases may cause either osteolytic or osteoblastic changes in the involved bone, depending on the nature of the tumour. The forms which produce thickening are usually prostatic while the lytic ones come from the lungs or the sinus. The adjacent cerebral tissue is likely to show edema (20).

Myeloma may have also orbital localization. It could be seen in cavities with definite borders, often multifocal, but with surrounding sclerosis in later stages. The typical seat is the orbital roof and the upper lateral walls. A similar changes should be found in histiocytosis x, eosinophile granuloma, Hand-Schüller--Christian and Letterer-Sive's diseases (10, 19).

Malignant tumours of paranasal sinuses often invade the orbit. The irregular bony destruction corresponds to a soft-tissue lesion extending outside the sinusal cavity up to the orbit.

VASCULAR ORBITAL TUMOURS

Hemangiomas are vascular hamartomas belonging to most frequent expanding benign lesions of the orbit. Capillary hemangiomas are infiltrating lesions, intra and extra muscle cone (20). The CT aspect shows a soft tissue lesion with quite homogeneous enhancement irregularly extended inside the orbit and covering the muscular cone and the intraconic lesions.

Cavernous hemangiomas are the most common slowly growing benign orbital intraconal expanding lesions (10). At CT there are visible round elliptical massess within the muscle cone with sharp limits, homogeneous density with marked enhancement, typically infero-lateral to the optic nerve which is deviated and compressed (Fig. 7). It is striking that a round or oval tumour located in the outer upper muscle cone, sharply delineated, unattached to optic nerve and

ocular muscles, spares a small triangular space in the orbital apex. Such a tumour is very likely to be a cavernous hemangioma (10, 20, 25).

The other forms are very rare, such as haemangiopericitomas and haemangioepitheliomas which develop outside the muscular cone on the nasal side of the optic nerve and their density is similar to the cavernous haemangiomas. Their margins are not well marked in correspondence to the orbital walls or the cone muscle, which may be included in the lesion.

Malignant forms such as angiosarcoma are even less frequent. Their diagnosis is generally histologic. Echography is useful complement to CT for the investigation of the vascular tumours mentioned above (10, 12, 20, 26).

DISCUSSION

The term orbital tumours encompasses the so-called expanding lesion as well as the space-occupying lesions or, more restrictly, only neoplasms. The radiological investigations should assess their presence first, and secondly, their seat and nature when possible. A classification may be based on very different criteria such as the primary or secondary nature of neoplastic lesion, the seat of tumour and its relation to the orbital structures, intraconic or extraconic lesions or tumour of the muscular cone itself. They may be confined to the extra-ocular muscles, outside the muscle cone or inside it. Among the tumours inside the muscular cone, localizations in the ocular globe, retrobulbar lesions or tumours of the optic nerve may be distinquished (2, 10, 11). Among the tumours originating outside the muscular cone it is possible to distinquish those deriving from the bone, from the sinus or from the lacrimal gland (20, 24).

The pathways of extension of an extraorbital neoplasm depend of the histology and the site of the lesion. Generally, malignant tumours invade directly, destroying the bone of the orbital walls, while less malignant lesion spread through one of the openings of the orbital walls or shift a less resistant bony walls, such as the ethmoidal lamina papyracea or the orbital floor. In this way tumours of the paranasal sinuses spread over the orbit through the medial wall or the orbital floor anteriorly whereas intracranial lesions expand through the postero-lateral wall or the optic canal and the sphenoid cleft. Usually the lower orbital cleft is a pathway for tumours coming from the pterygopalatina or infratemporal fossa. Tumours of the skin and subcutaneous tissue of the face, however, may invade the orbit directly from the anterior route. The most common neoplasm of the nasal cavity and paranasal sinuses is squamous carcinoma which is characterized at CT by the presence of soft tissue mass invading the adjacent tissues and destroying the walls (10, 12, 20). Orbits may also be affected by ocular and orbital complications following radiation therapy of paranasal sinuses malignancies (1, 19).

Since the advent of CT imaging in 1974 it has become a new and more powerful instrument to scan the orbit and its content. Although technologically limited, CT has been providing useful information in evaluating the orbital tumours. In this way we can get details on tumour localization, invasion of intra-orbital structures, involvement of retro-orbital regions, staging and follow-up of malignant tumours. The method can help identify significant and less characteristic findings (1, 17, 20, 22).

The progressive improvement of CT and, particularly, new refinements like multiplanar reformed images, thin-section-scanning and high resolution brought to notable results in the study of orbital tumours both in children and adults even making a histological characterization possible (20). Therefore, CT should be considered the best existing method in the evaluation of orbital lesions since it detects up to 96 per cent of proved tumours (4, 18).

In order to understand better the CT role in the study of orbital lesions, a rational outline of a possible diagnostic protocol should be carried out. The first step ought to be absolutely clinical because a complete opthalmologic picture provides all the necessary elements which are often decisive in establishing the final diagnosis (16, 19, 20).

A standard radiographic investigation may often turn to be sufficient in the preliminary stage and then resorting to the complex stratigraphy is unnecessary. Selective angiography is less and less necessary as the clinical and radiological knowledge progresses and the high-resolution equipment gives better results (15). We must remember that in some cases even after CT, it is indispensable to resort to an angiographic examination, which must always be of selective-type, carried out in pre-surgical phase or in the case of therapeutic angiography (20). Neverthless, CT limits have to be pointed out. As a matter of fact, in the common experience quite constant CT semeiological features in different lesions have been seen, as to allow one to make any hypothesis on CT semeiology on the pathologic process of the orbital region (7, 10, 20).

An accurate re-examination of the CT signs detectable in orbital pathology may be tried to classify each finding into one of the following three groups: pathognomic, specific and characteristic signs. A pathognomic sign means a radiological sign which outlines the disease: volume, form limits, mass effect, densitometry of basic and after contrast medium administration. These make it possible to diagnose the pathology and to establish the therapy. Generally these signs concern disorders of the skeleton or orbital wall, and are uncommon. Pathognomonic signs can actually be found in the case of dermoids or epidermoids (20, 23). Finding of an alteration of the orbital posterolateral wall in the case of Recklinghausen's disease, and different diagnositc possibilities in the case of mucocele involving the orbit (Fig. 8), are always pathognomonic, too (10).

Signs concerning a lesion within the muscular cone and within the orbital content, are not very often pathognomonic. It occurs in the case of the psam-

momatous meningioma with its characteristic thickening of the nerve and calcifications (5, 6, 7). More often, it is a matter of specific signs which means a constant casual relationship between radiological signs and a given group of diseases. For example, a specific sign of a benign intraconic tumour in an expansive retrobulbar process with net limits, and quite homogeneous density which increases after contrast medium injection. It is a specific, and therefore not pathognomonic sign, since the very same characteristics are detectable in the case of meningioma, neurinoma and hemangioma (20).

There were mentioned above characteristic signs. There are indeed basic signs of the CT semeiology. Many characteristic signs together give the specifity, as in the case of muscular thickening. This is the case, for example, with the inflammatory pseudotumour, where we do find a variability of CT signs in the clinical course, and a disappearance of some elements after suitable therapy (8, 10).

Echography, acting as complementary help, is highly interesting, mainly because it gives a pathognomonic character to specific signs. This occurs to lesions at the lacrimal gland and intracone level, where echography allows a possible tissue diagnosis which suits to the elements deriving from CT investigation (6, 18, 21). As we mentioned before, angiography contribution is more infrequent, but sometimes decisive, as in the case of orbital meningioma or hemangioblastóma (10, 14, 15).

It should be emphasized that very different lesions can actually give similar or the same signs. Sometimes it is difficult to find a difference between lymphomas and chronic inflammatory process in the same localization. A spheno-orbital meningioma can be similar to a bony metastasis from mammary gland carcinoma (20).

Orbit CT data are seldom pathognomonic. Diagnosis often derives from the association of many CT signs with specific clinic elements, or elements deriving from instrumental side investigation, which have a diagnostic synergism (5, 13, 17, 20, 25). The very value of CT stands in its relative harmlessness and in its fast anatomical synthesis (7). Images clearness seldom correspond to an absolute semeiological value, and therefore we should not be deceived by them. As usual, the good clinical semeiology has the last word, when dealing with neurological investigation protocols on different occasions.

CONCLUSION

According to our experience and data from the literature CT is in fact considered extremely important for a good evaluation of localization, size and shape of orbital tumours and also for identification of the relationship with the surrounding structures. On the other hand echography and cerebral selective

angiography provides, in some cases, a differential diagnosis either by itself or by offering complementary findings to CT data.

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STRESZCZENIE

Na podstawie własnego doświadczenia i danych z piśmiennictwa autorzy omawiają praktyczną przydatność badania TK w wykrywaniu procesów rozrostowych oczodołu. Okazało się, że szczególną rolę w procesie diagnostycznym odgrywa właściwie użyta technika badania TK. Od lat stosowane przekroje osiowe okazały się niewystarczające i dlatego należy uzupełniająco wykonywać przekroje czołowe i zdjęcia rekonstrukcyjne.

Na przykładach najczęściej występujących guzów oczodołu omówiono skuteczność diagnostyczną oraz możliwość w pewnych przypadkach ich rodzajowego rozpoznania. Wskazano na szczególną wartość danych klinicznych i innych badań, takich jak ultrasonografia oraz angiografia selektywna.

РЕЗЮМЕ

На основании собственного опыта и данных по медицинской литературе авторы обсуждают практическую пригодность исследования КТ в выявлении процессов пролиферации глазницы. Оказалось, что особую роль в диагностическом процессе исполняет правильное применение техники КТ. Применяемые раньше сечения по оси оказались недостаточными и поэтому следует их пополнять фронтальными сечениями и реконструктивными снимками.

На примере наиболее часто встречаемых опухолей глазницы в настоящей работе обсуждается диагностическая эффективность, а также возможность распознать тип этих опухолей. Авторы указывают на особую ценность клинических данных и других исследований, таких как ультрасонография и селективная ангиография.

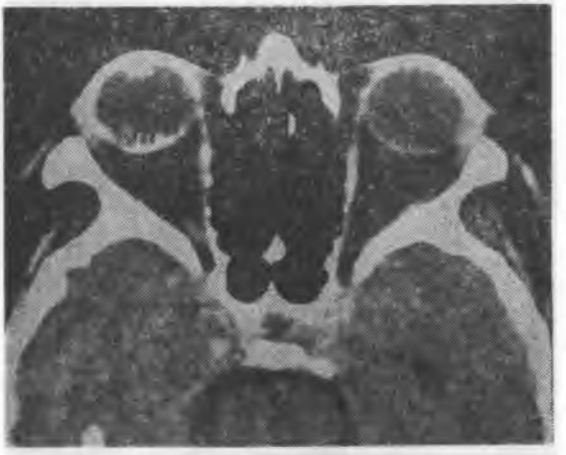

Fig. 1. Narrow soft tissue mass is seen in the posterior aspect of the left globe protruding partly into the vitreous chamber (m — melanoma)

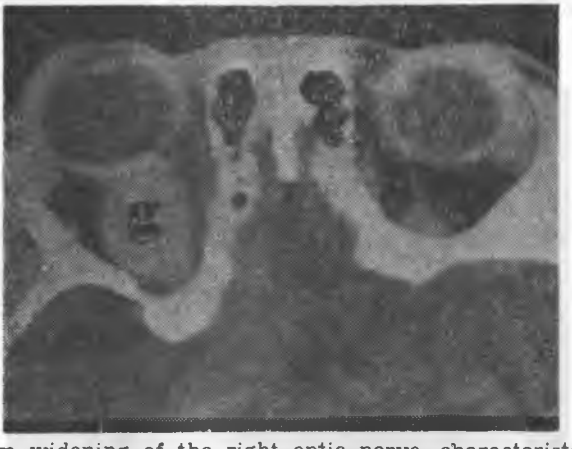

Fig. 2. A fusiform widening of the right optic nerve, characteristic of glioma (g); mild proptosis of the right eyeball is seen

Fig. 3. An axial scan demonstrates tubular thickening of the left optic nerve with a "railroad configuration" i.e., dense periphery with central lucency, characteristic of meningioma (m)

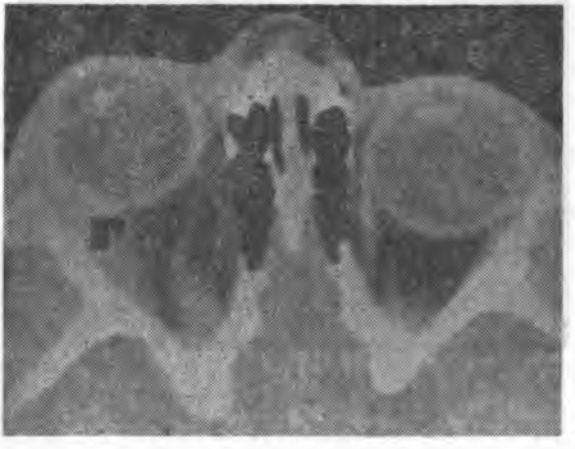

Fig. 4. CT scan shows a high-absorption, soft tissue mass in the lateral part of the right orbit; the mass has smooth margins and homogeneous appearance; the globe is displaced anteriorly and medially (r — rhabdomyosarcoma)

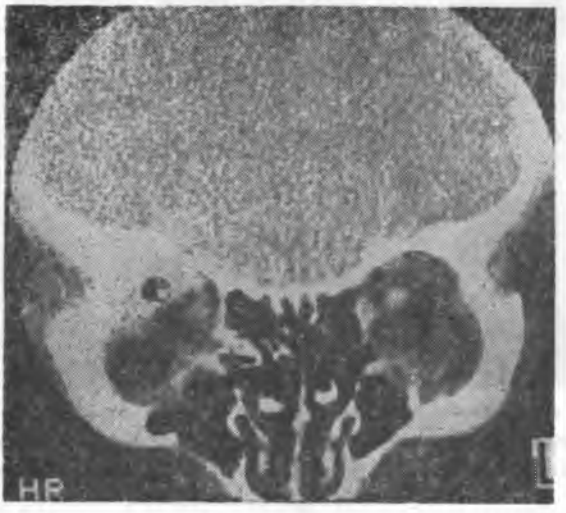

Fig. 5. A coronal scan shows a soft homogeneous tissue mass in the anterior lateral aspect of the right orbit; the histological diagnosis is lacrimal cylindroma (c)

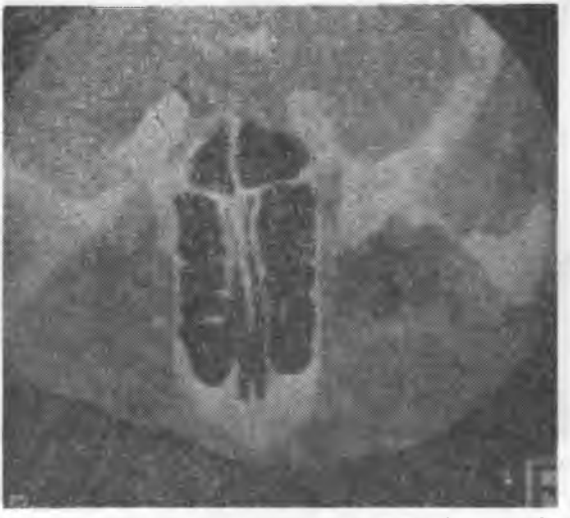

Fig. 6. An axial scan demonstrates a cystic mass in the retrobulbar part of the right orbit; the mass has a cystic low-density center; the globe is displaced anteriorly (d — cystic dermoid)

Fig 7. An axial scan shows a large intraconal mass in the left orbit; the lesion is smoothly marginated and has a homogeneous appearance; the left optic nerve is displaced upwards and laterally; the globe is displaced anteriorly (e — eyeball, t — cavernous hemangioma)

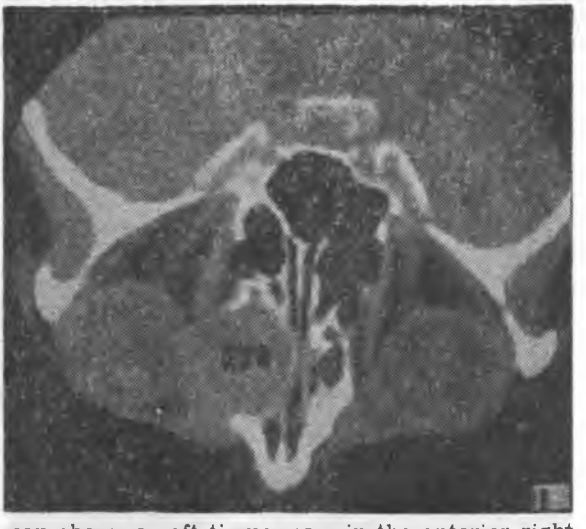

Fig. 8. An axial scan shows a soft-tissue mass in the anterior right ethmoid sinuses, bulging into the right orbit; the globe is displaced laterally (m — mucocele)