An external coil is often used when MRI of the orbital region is performed. The effectiveness of MRI in the orbit is comparable to that of CT, but MRI allows a freer creation of images and also demonstrates structures more clearly.

Melanomas and retinoblastomas are intraocular tumors. While melanomas generally affect adults, retinoblastomas are more common in children. Depending upon the melanin content, the signal intensity of melanomas varies; hemorrhage, which often accompanies it, produces an even more varicolored image. Because melanin pigment is paramagnetic, melanin-abundant melanoma shortens both $T_1$ and $T_2$ than more common tumors. Thus, it is seen as a high signal in the $T_1$ weighted image and as a low one in the $T_2$ image. Under these circumstances, it becomes difficult to differentiate between methemoglobin and fatty tissue. Retinoblastoma tends to present a more heterogeneous picture by virtue of its necrosis, hemorrhage, and high content of calcifications.

In tumors of the posterior orbit, it is important to ascertain the relative position of the optic nerve. It is possible to differentiate between meningiomas and the material of the optic nerve itself. Meningiomas show various signal intensities, but this probably depends upon the degree of calcification. Because of their fat components, dermoids appear as a high signal intensity in the $T_1$ weighted image, making diagnosis comparatively easily. It is often difficult to differentiate between cavernous angiomas, neurinomas, and metastatic tumors.

The rapid blood flow in vascular lesions such as AVM and carotid cavernous sinus fistulae is shown as a signal void, and diagnosis is therefore easy. If blood clots accumulate in the AVMs, this signal void will disappear. Idiopathic inflammatory pseudotumors are common intraorbital lesions in adults. They are comparatively easy to diagnose clinically, and steroids are believed to be effective in their treatment. They appear on MRI as isointensity signals in both the $T_1$ and $T_2$ weighted images. In thyroid orbitopathy, ocular muscles are enlarged and intraorbital fat is increased; in blowout fractures, the displaced orbital fat and ocular muscles are well displayed. In retinal detachments, fluid collected beneath the retina accumulates a large quantity of protein, making it difficult to differentiate it from ordinary hemorrhages. Fundoscopy is useful clinically and MRI can be used primarily to differentiate it from neoplastic lesions.
Fig. 12.1. Optic Glioma. A 12-year-old female. The patient came to our clinic with complaints of headaches and visual disturbances. Her visual acuity for the right and left eyes was 1.0 and 0.3, respectively, and could not be improved. There was also a defect in the upper left visual field. Fundoscopy revealed papilledema but there was no optic atrophy. No other neurological abnormalities were present, nor were there café au lait spots on the skin.

a, b CT scan. In the plain axial CT, marked dilatation of the inferior horn of the lateral ventricle and an isodensity mass are seen in the left optic nerve and hypothalamic region. The left suprasellar portion of the mass is enhanced in the contrast CT scan.

c MRI. In the T₁ weighted sagittal image, swelling of the left optic nerve and an isointensity mass are clearly demonstrated. In the T₂ weighted image, the mass is seen as a high intensity.