Oligodendrogliomas comprise 5-9% of all primary intracranial gliomas (1). They mainly occur in the cerebral hemispheres. Intraventricular location as a primary site is rare (1). Although the histologic features of intraventricular and parenchymal oligodendrogliomas are similar, their imaging characteristics and presenting symptoms are quite different. In this paper we present computed tomography (CT) and magnetic resonance imaging (MRI) features of a purely intraventricular oligodendroglioma.

Case Report
A 54-year-old male patient presented with a two-month history of amnesia and seizures. Physical and neurological examinations were normal. Routine laboratory investigations were unremarkable.

CT showed a partially calcified right ventricular mass, which was conforming to the shape of the ventricle. The mass was rather heterogeneous with cystic areas isodense with the cerebrospinal fluid and solid portions isodense with gray matter (Fig 1). The right lateral ventricle was dilated. MRI revealed a lobulated mass in the right lateral ventricle adjacent to the foramen of Monro and septum pellucidum, with displacement of the midline structures. The right lateral ventricle was dilated. There was no peritumoral edema. The cystic parts of the lesion

**Summary**
Oligodendrogliomas commonly arise from the cerebral hemispheres and may secondarily invade the adjacent ventricles. Primary intraventricular oligodendrogliomas are quite rare. In this report we describe computed tomographic and magnetic resonance imaging findings of a right lateral ventricular oligodendroglioma in a patient presenting with seizures and amnesia.

**Key Words:** Oligodendrogloma-Computed Tomography - Magnetic Resonance Imaging
had a higher signal intensity than cerebrospinal fluid on T1-and proton density weighted images. The solid portions were iso-hyperintense than cortical gray matter on T1-weighted images and heterogeneously hyperintense compared with gray matter on T2-weighted images (Figs. 2,3).

Figure 1: Non enhanced axial CT section at the level of the lateral ventricle shows a partially calcified mass near the foramen of Monro with cystic and solid areas and dilatation in the right lateral ventricle.

Figure 2: On non enhanced T1-weighted axial spin echo (SE) MR image, the cystic areas of the lesion are hyperintense than cerebrospinal fluid and the solid portions are iso-hyperintense compared to cerebral gray matter.
Especially on T2-weighted images numerous hypointense septae rendered the lesion a multiloculated appearance (Fig. 3). The solid parts of the lesion enhanced remarkably after the injection of gadolinium (Fig. 4). At surgery, the tumor was removed subtotally. Pathological examination revealed oligodendroglioma.

Figure 3: On the T2-weighted image, the cystic parts appear isointense with cerebrospinal fluid, and the solid parts are slightly hyperintense than gray matter. Note several hypointense septa rendering the lesion a multiloculated appearance (arrows).

Figure 4: Gadolinium enhanced T1-weighted image reveals marked enhancement in the solid parts of the intraventricular mass.
Discussion

Oligodendrogliomas are composed of small oligodendrocytes of a rather uniform size (2). Nearly half of the lesions also contain astrocytes and spongioblasts (1,2). The majority occur in the cerebral hemispheres, particularly in the frontal lobes. Only a small percentage originates from within the ventricles. Although intraventricular oligodendrogliomas have the same histological features as the parenchymal lesions, they have different clinical and imaging characteristics (3).

The intraventricular oligodendrogliomas are slightly more common in females (3), unlike the hemispheric variety, which shows a male predominance (4). Intraventricular oligodendrogliomas frequently occur in the third and fourth decades of life. While it has previously been stated that intraventricular oligodendrogliomas present at an earlier age (5) several recent series showed no significant age difference between the parenchymal and intraventricular tumors (3-5). Although seizure is the most common presenting symptom of hemispheric oligodendrogliomas (4), the intraventricular variety commonly causes signs of increased intracranial pressure (3,5). The symptomatology consisting of seizures and amnesia and relatively older age of our patient differ from the typical presentation of an intraventricular oligodendroglioma.

Intraventricular oligodendrogliomas are most commonly found in the anterior parts of the lateral ventricles (3). There is only one case involving the occipital horn and atrium of the lateral ventricle (6). In our patient the mass was predominantly in the anterior part of the right lateral ventricle close to the foramen of Monro and adjacent to the septum pellucidum.

The matrix of an intraventricular oligodendroglioma tends to be hyperdense relative to the brain parenchyma (3), unlike parenchymal oligodendrogliomas, where the matrix is usually heterogeneous or hypodense (7). Low-density foci representing areas of necrosis and hyperdense areas caused by hemorrhage may be identified in both parenchymal and intraventricular types. Nodular and plump calcifications are more prominent in the parenchymal type (3,5,8). Unless malignant features are present edema is not associated with either type (8). Contrast enhancement is mild or moderate in the intraventricular oligodendrogliomas but is unusual in the parenchymal variety.

Experience is limited on MR imaging of intraventricular oligodendrogliomas. MRI is superior over CT in determining the origin and extent of the lesions (3), which is crucial for planning of surgery. In our patient the intraventricular mass lesion had a heterogenous signal intensity on both T1- and T2-weighted images with cystic and solid portions and linear hypointense septal structures. The solid portions of the lesion enhanced remarkably on postgadolinium images.

Lateral ventricular masses that may be confused with intraventricular oligodendrogliomas are subependymomas, astrocytomas, ependymomas, gangliogliomas, subependymal giant cell tumors, central neurocytomas and meningiomas.

Subependymomas occur in the same age group as intraventricular oligodendrogliomas but favor the fourth ventricle and usually have an extraventricular component (2). Rarely, however, a subependymoma involves a lateral ventricle, near the foramen of Monro, when the differential diagnosis from oligodendrogliomas is quite difficult. The matrix of a subependymoma is usually isodense with brain parenchyma and may demonstrate minimal enhancement after contrast administration (9).

Ependymomas are difficult to distinguish from subependymomas but they usually enhance after contrast administration and tend to calcify in an irregular manner (2). Some are partly cystic. Ependymomas are seen in a younger age group than subependymomas.

Like intraventricular oligodendrogliomas gangliogliomas also affect the young adults, however they are usually found in the anterior third ventricle rather than in the lateral ventricles.
Astrocytomas may be found in the lateral ventricles. Their typical location is in the frontal horns, more anterior than the intraventricular oligodendrogliomas. They usually enhance and have a hyperdense matrix (9).

Subependymal giant cell astrocytomas are typically seen in patients with tuberous sclerosis. They usually occur in the region of foramen of Monro and are accompanied by other cerebral findings of tuberous sclerosis (2), which are helpful in distinguishing them from intraventricular oligodendrogliomas.

Choroid plexus papillomas also show marked enhancement and usually occur in the trigones of the lateral ventricles, in contradistinction to oligodendrogliomas, which tend to locate more anteriorly near the foramina of Monro. Patient age is another important differential diagnostic feature in choroid plexus papillomas, which are typically seen in young children (10).

Central neurocytoma, a recently described variant of neuroblastoma, may occur in the lateral ventricles and be difficult to distinguish from the oligodendroglioma on routine histopathological examinations. These lesions have a better prognosis than oligodendrogliomas and they usually enhance (2).

Intraventricular meningiomas tend to occur in the atria of the lateral ventricles. They are typically isointense with the cortical gray matter and show marked and homogeneous enhancement (2,9).

Epidermoid and dermoid tumors may also present as intraventricular masses. Epidermoids are frequently seen in the fourth ventricle. On MRI epidermoids are heterogenously isointense with cerebrospinal fluid and do not enhance after gadolinium administration. Dermoid tumors and teratomas can easily be identified by the presence of fat (9).

Due to their size and deep location, intraventricular oligodendrogliomas are not generally amenable to complete removal. Most cases are excised subtotaly followed by CSF shunting to treat or prevent hydrocephalus.
REFERENCES


