

Anterior Interhemispheric Transcallosal Approach

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The Anterior [Interhemispheric Transcallosal Approach](#) is a [neurosurgical technique](#) used to access lesions located in the [third ventricle](#), the [corpus callosum](#), and surrounding structures. This approach involves a midline craniotomy, typically extending anteriorly, followed by careful dissection along the interhemispheric fissure to expose the corpus callosum. A callosotomy is then performed to enter the lateral ventricles, providing a corridor to access deep midline structures.

Indications

The transcallosal approach is the most appropriate approach to the [interforniceal approach](#) which localize and totally remove space-occupying lesions around the anterior third ventricle region such as craniopharyngiomas and gliomas

[Central neurocytoma](#)

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Large tumors invading the dorsal part of the anterior [third ventricle](#) are difficult to manage. The anterior [transcallosal approach](#) is usually used to manage these tumors.

A anterior callosal section combined with the anterior interhemispheric (AIH) [trans-lamina terminalis approach](#) for these tumors has excellent results. The AIH approach is useful for removing tumors in and around the anterior part of the third ventricle. However, AIH alone is insufficient for large tumors invading the dorsal part of the anterior third ventricle. In such situations, simple anterior callosal section enables the neurosurgeon to extirpate the caudal part of the tumors deeply hidden from operative field, sparing the foramen of Monro, fornix, etc.

Four large tumors (malignant teratoma, recurrent chordoid glioma, recurrent papillary tumor of pineal region occupying the third ventricle, and paraventricular meningioma) were treated without major complications. The malignant teratoma case exhibited no recurrence with >10 years follow-up. The chordoid glioma and papillary tumor of pineal region were totally removed. The meningioma was subtotally removed except only a small tumor around the bilateral anterior cerebral artery. This simple technique is a new way to manage difficult large lesions in and around the third ventricle ¹⁾.

Craniotomy

Classically, at transcallosal [approach](#), the [craniotomy](#) is placed two-thirds in front and one-third behind the [coronal suture](#).

The interhemispheric transcallosal approach offers an excellent surgical corridor for the treatment of deep-seated midline lesions. The approach typically requires the sacrifice of one or more middle-third [superior sagittal sinus](#) (SSS) cortical [bridging veins](#), which introduces the risk of venous infarction and associated neurological injury.

The occlusion of one or more middle-third SSS cortical bridging veins related to the interhemispheric transcallosal approach resulted in no incidence of cerebral venous infarction in this pediatric population ²⁾

see [Interhemispheric Transcallosal Transchoroidal Approach](#)

see [Occipital transcallosal approach](#)

see [Endoscopy assisted interhemispheric transcallosal hemispherotomy](#).

Once through the corpus callosum, anatomical landmarks are used to determine which ventricular space has been entered. The thalamostriate vein and foramen of Monro are used for localization. If the vein appears to the right of the foramen, then the right lateral ventricle has been entered; if it appears to the left, then the left lateral ventricle has been entered; and if no vein is visualized, then a cavum septum has been encountered

Anatomical landmarks

The central sulcus was identified and surface landmarks determined as the points 5 cm (P5) and 7 cm anterior to the central sulcus (P7). The distances between P5 and P7 and the upper margin of the interventricular foramen, which delineate the surgical corridor chosen to avoid disturbance of important neural structures, were 46.26-60.96 (54.09 +/- 3.35) mm and 48.00-62.00 (54.94 +/- 3.09) mm, respectively. The distances between the upper margin of the hemisphere and the cingulate sulcus, especially important for avoiding damage to the cingulate gyrus and other mesiolimbic structures, were 13.54-30.00 (21.28 +/- 3.89) mm and 12.22-29.52 (21.12 +/- 3.90) mm at the level of P5 and P7. The distances between the upper margin of the hemisphere and the callosal cistern containing the pericallosal artery were 28.34-40.50 (33.94 +/- 2.84) mm and 28.16-40.26 (33.50 +/- 2.61) mm, respectively. Normative morphometric data of the structures involved in the surgical procedure are necessary for planning and performance of the transcallosal-interforniceal approaches. This study of a large series of specimens shows that these measurements have large individual variations ³⁾.

The anterior [transcallosal approach](#) provides a direct and adequate pathway to the lateral ventricles, where the foramen of Monro serves as a natural entrance into the anterior third ventricle, especially when the foramen is dilated by a lesion. When the midsuperior portion of the [third ventricle](#) cannot be reached, the interforaminal or the subchoroidal exposures have been advocated.

Stereotactic techniques contribute to a minimal invasive approach and reduce morbidity.

Nine patients harbouring anterior third ventricular cysts (seven colloids and two intrinsic craniopharyngiomas) underwent anterior transcallosal microsurgical excision assisted by an interactive infrared-based image guided system (EasyGuide, Neuro, Philips). There were 4 men and 5 women ranging in age from 15 to 42 years (mean 28.5). Transcallosal transforaminal (5 cases) or interforaminal (4 cases) approaches allowed total excision in eight patients and subtotal in one. Postoperative morbidity included a case of transient hemiparesis and a case of transient short-term memory disturbances; both resolved in the first months. Mortality was zero. Particular advantages of the method were accurate trajectory and position of callosotomy incision determination, visualisation and avoidance of superior sagittal sinus, retraction of bridging veins and the often variable pericallosal arteries, spatial orientation within the ventricular system, and identification of the periventricular anatomical structures ⁴⁾

Retrospective case series

The aim of a study was to introduce and assess a precise microsurgical technique for managing colloid cysts using the anterior interhemispheric transcallosal approach.

The research involved a retrospective analysis of 14 cases between 2021 and 2023 treated with the anterior interhemispheric transcallosal approach by two experienced skull base surgeons. The evaluation encompassed demographic, clinical, radiological, histological, and surgical data. Additionally, the Colloid Cyst Risk Score (CCRS) was used to assess the risk of obstructive hydrocephalus. The procedure incorporated neuronavigation and ultrasound to determine the precise entry point and to plan the trajectory.

The minimally invasive microsurgical technique was effectively employed in all 14 cases, with no reported postoperative complications. Post-surgery MRI scans confirmed complete cyst removal, with an average callosotomy measurement of 5.4 ± 2.5 mm. Importantly, none of the patients experienced disconnection syndrome associated with callosotomy.

The adapted microsurgical approach via the anterior interhemispheric transcallosal method emerges as a secure and efficient way to address colloid cysts. It ensures comprehensive cyst removal while minimizing complications, boasting advantages such as reduced invasiveness, enhanced visibility, and minimal tissue disturbance, thereby confirming its role in colloid cyst surgical interventions ⁵⁾.

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