

# NEUROIMAGE

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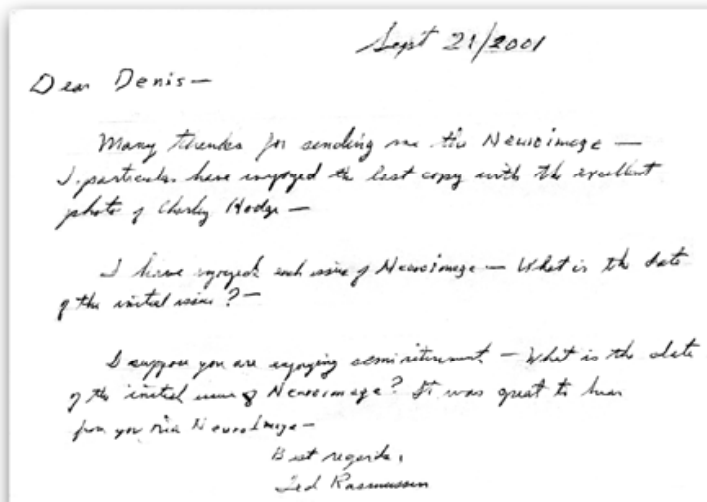
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Portrait of Dr. Rasmussen by Lynn Buckham, 1974, which hangs in the foyer of the Jeanne Timmins Amphitheatre

# LETTER FROM THE EDITOR

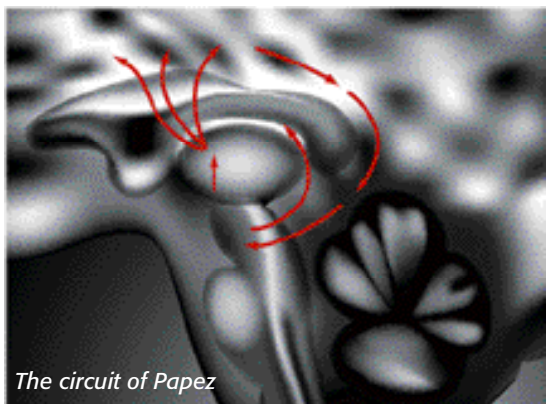
DR. DENIS MELANÇON

This issue of Neuro Image wants to be a special tribute to Theodore Rasmussen who passed away last January. Dr William Feindel has prepared the insert, abstracted from the special memorial presentation at the Neuro on March 22<sup>nd</sup>. I personally have always enjoyed working with Ted Rasmussen, reviewing pneumograms and angiograms prior to his surgical treatment of epilepsy, or as participant of the Epilepsy Conference. He has always impressed me as a man of duty, expertise and honesty. Last September, he sent this short note upon reception of the Neuro Image issue on Charlie Hodge. The answer to his question: Vol. 1 No. 1 of NeuroImage was in 1984.



## THE NEURAL CIRCUIT OF PAPEZ

DRS MAURIZIO COGONI & DONATELLA TAMPIERI

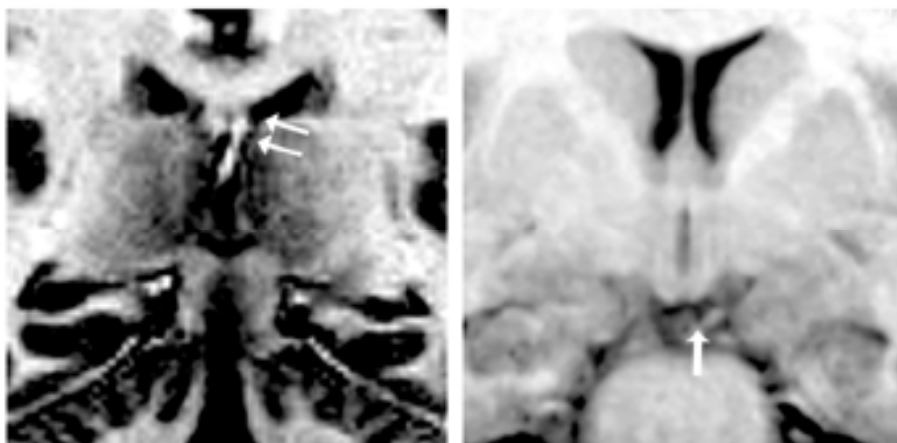


Recent studies in patients with limbic epilepsy have identified abnormalities in the fornix and mammillary bodies in addition to the classical findings of hippocampal atrophy and gliosis.

In a preliminary review of 125 patients with temporal lobe epilepsy and unilateral hippocampal atrophy, we found ipsilateral fornix atrophy in 66 (52.8%) and atrophy of ipsilateral mammillary body in 38 (30.4%). This relatively high incidence of fornix atrophy could be a useful complementary imaging finding in temporal lobe epilepsy.

Studies have also pointed out that the abnormalities along the circuit of Papez may represent an additional marker for evaluation of the seizure focus in bilateral mesial temporal sclerosis/atrophy.

More investigation of these structural changes is underway.



Left hippocampal atrophy:  
fornix atrophy (⇔)  
mammillary body atrophy (→)

# THEODORE BROWN RASMUSSEN (1910-2002) SURGEON, SCIENTIST, TEACHER AND FRIEND

BY DR. WILLIAM FEINDEL, OC, GOQ, MDCM



*Portrait of Theodore Rasmussen  
by Lynn Buckham, 1974*

## Family and Education

Theodore Brown Rasmussen was born on 28<sup>th</sup> April 1910 in Provo, Utah, the son of Gertrude Brown and Andrew Theodore Rasmussen<sup>1</sup>. His father became Professor of Neuroanatomy at the University of Minnesota from which Dr Rasmussen later graduated with a BS, MB, 1934; MD, 1935; MSci in Neurology, 1939. He supported himself through medical school by playing clarinet and saxophone in a jazz band. Because of his keen interest in track and field sports he arranged a general surgical internship in New York so he could attend these events at Madison Square Garden. He then continued on the neurosurgical service at King's County Hospital in Brooklyn for two years with Dr Jefferson Browder, a trainee of Harvey Cushing. Browder had developed one of the best centers for the treatment of head injuries in the United States. Young Rasmussen decided on a career in this specialty. On the advice of Dr Owen Wangensteen he spent six months at the Montreal Neurological Institute, but then followed Dr Wilder Penfield's suggestion to do a fellowship in neurology for three years at the Mayo Foundation. He returned to the MNI from 1939 to 1942 for his neurosurgical training under Wilder Penfield, William Cone and Arthur Elvidge.

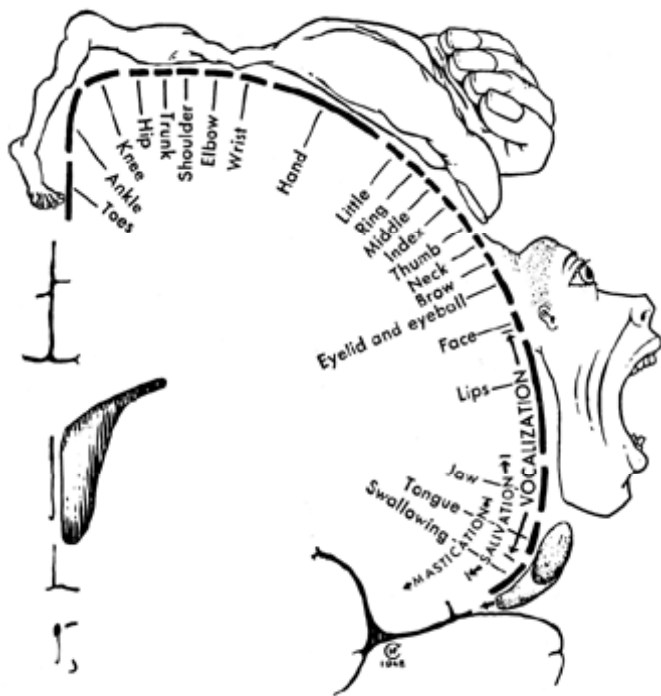
## Military Service

Eight months short of completing his senior residency, he was called up for the United States Army. He spent the next four years as Chief of the Neurological Section in the 14<sup>th</sup> Evacuation Hospital in the India-Burma theater of operations on the Ledo Road. He was discharged with the rank of Lieutenant-Colonel. During that time he treated a series of a hundred patients with causalgia by sympathectomy and recorded these case studies with a colleague in the *Journal of Neurosurgery*.

<sup>1</sup> Many years later, a neurosurgical colleague earnestly queried, "Ted, how come you were born in such an out-of-the-way place as Provo?" Ted succinctly replied, "I wanted to be near my mother."



*Group of MNI fellows and staff with Dr Penfield. Dr Rasmussen can be seen (2<sup>nd</sup> on left) in the center of the group, with arms on the sofa. (circa 1939)*



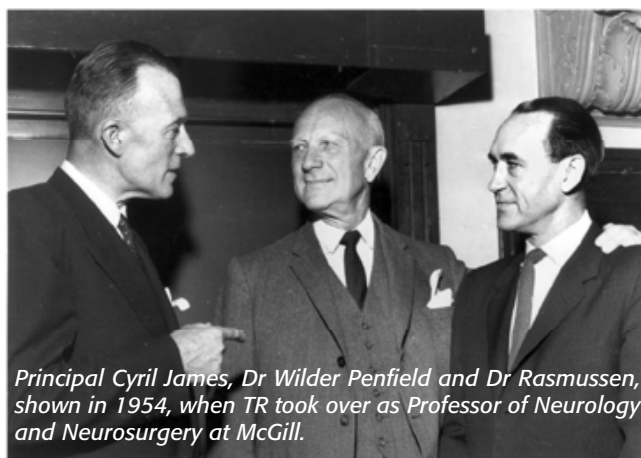
"Motor homunculus" from Penfield and Rasmussen  
*The Cerebral Cortex of Man* (1950)

In 1954 Dr Rasmussen became Professor and Chairman of Neurology and Neurosurgery at McGill and when Wilder Penfield retired in 1960, Rasmussen succeeded him as Director of the Montreal Neurological Institute. He also served as Neurologist and Neurosurgeon-in-Chief of the Royal Victoria Hospital. In 1963, in response to provincial legislation, the Montreal Neurological Hospital was constituted, legally separating the hospital from the teaching and research institute; Rasmussen thus took on the title of the first Director-General. He efficiently administered the Institute, Hospital and Department from 1954 to 1972 in a well-ordered and evenhanded manner; during that same time he continued in active surgical practice.

## McGill and Chicago

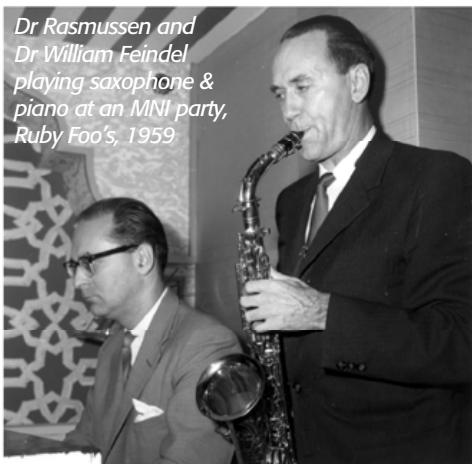
For the next two years he was Assistant Neurosurgeon and Lecturer in Neurology and Neurosurgery at McGill, during which time he worked on the detailed analyses of cortical localization of sensory, motor and speech function in four hundred patients on whom brain mapping had been carried out as part of the surgical treatment of epilepsy. The resulting monograph by Penfield and Rasmussen, *The Cerebral Cortex of Man*, published in 1950, became one of the classical references in this field. It included extensive maps of the sensory and motor cortex and, derived from those, new versions of the familiar homunculus.

In 1947 Dr Rasmussen was appointed Professor of Neurological Surgery at the University of Chicago. Here he initiated a project using radioactive yttrium to deliver beta-radiation to ablate the pituitary gland to treat patients with metastatic cancer. He and his father also notably reported on the histology of the pituitary gland of "Bushman", a 500-lb gorilla from the Lincoln Park Zoo who had succumbed to a strange peripheral neuropathy.



Principal Cyril James, Dr Wilder Penfield and Dr Rasmussen, shown in 1954, when TR took over as Professor of Neurology and Neurosurgery at McGill.

Dr Rasmussen and Dr William Feindel playing saxophone & piano at an MNI party, Ruby Foo's, 1959



I first came to know Ted Rasmussen in June of 1942, when I came from Dalhousie Medical School for two weeks at the Neuro to learn techniques for examining peripheral nerves. Dr Penfield assigned Dr Rasmussen as my mentor. He was the Fellow in neuropathology and gave me a "Madrid cubicle" in the lab. I quickly went through the techniques of Bielschowsky, Bodian and Weigert under his watchful eye. He was kindness itself. It was a warm June and the opened windows of the lab were our only air conditioning. A bagpiper appeared for several nights in Molson Stadium practicing vigorously. By the third night, Ted could stand it no longer and said, "Let's go to a movie". On the way down University Street he recited the records to the minute and second of the main track and field champions at that time. We became good friends for the next sixty years.

## Contributions to Neurosurgery

Dr Rasmussen contributed to important aspects of neurosurgery. In addition to the surgery of the pituitary gland and treatment of pain, he carried out experimental studies on cerebrovascular problems and reported on tumors of the brain and spinal cord. He substantiated the application of the carotid-amytal test introduced by Juhn Wada so that it could be used safely, not only for testing cerebral lateralization of speech function, but modified as well for assessment of memory and EEG localization of epileptogenic areas. In these studies he worked closely with Herbert Jasper, Peter Gloor, Brenda Milner and a continuing roster of young neurosurgical fellows. But his main interest centered on the surgical treatment of epilepsy and on the meticulous documentation of the long-term surgical results. Rasmussen consolidated and extended the pioneer work of Wilder Penfield and by his assiduous focus on follow-up studies established the evidence-based role of surgery in the amelioration and frequently the cure of focal seizures. In his 25 years (1955-1980) at the Neuro, Rasmussen probably performed more operations for epilepsy than any other surgeon of his time and became the foremost authority in this field. The MNI surgical records, an unmatched world series of some 3000 cases, continue to serve as the standard of reference for other neurosurgical centers where the systematic surgical treatment of epilepsy became eventually adopted.

## Rasmussen's Syndrome

In 1958, with Jerzy Olszewski and Donald Lloyd-Smith, Theodore Rasmussen published the clinical and pathological features of three patients with chronic encephalitis associated with epilepsy. This newly defined entity, later referred to as Rasmussen's syndrome, provoked much discussion and research in regard to etiology and possible treatment. The role of the surgical treatment in selective examples of this syndrome was established and often involved major interventions such as hemispherectomy. This later led to the recognition of postoperative hemosiderosis and hydrocephalus, a sometimes fatal complication. Rasmussen pioneered the modification of the surgical technique to a "functional disconnection" leaving *in situ* most of the abnormal brain tissue, a maneuver that greatly reduced this hazard.



*Directors of Neurological Institutes: Francisco Escobedo (Mexico); Dr John Green (Phoenix, Arizona); Theodore Rasmussen (Montreal). (Photo taken at opening ceremonies of the Penfield Pavilion, 1978).*

## Achievements

In 1972, after retiring from his administrative positions at the Neuro and McGill, he continued actively in his surgical practice and follow-up analyses of seizure surgery. During his career he published 175 papers and served effectively as a teacher and role model to many young neurosurgeons and neuroscientists. He represented the Neuro at national and international meetings, being widely sought after as a visiting professor and lecturer. As one of the outstanding leaders in neurosurgery, he was president of many societies, including the Association

of Neurosurgeons of Quebec, the Canadian Neurosurgical Society, the American Academy of Neurological Surgeons and the American Epilepsy Society. He received the Outstanding Achievement Award from both the University of Minnesota and the University of Chicago and held honorary degrees from Edinburgh and Umeå Universities. He served on the American Board of Neurological Surgery (1970-76) and on the Epilepsy Advisory Committee of the National Institute for Neurological Diseases and Stroke (1972-76). He was awarded the distinction of Emeritus Professor at McGill in 1980, and selected for the Distinguished Service Award of the Society of Neurological Surgeons in 1989.



*Catherine Archibald-Rasmussen,  
wife of Theodore Rasmussen.*

## Envoi

In 1947 Theodore Rasmussen married Catherine Archibald of Truro, Nova Scotia. With a son and three daughters they enjoyed a full family life. They devoted much of their time to entertaining the Fellows and visiting former Fellows of the Neuro. They were both enthusiastic sports, enjoying skiing, scuba diving and boating. Kay became a skilful photographer. Ted kept up his keen interest in jazz, able to recall names of famous instrumentalists and reciting the exact records of many champions in track and field events.

When Catherine predeceased him in 1998, Theodore moved to Calgary to be with his daughters and their families who provided him with comfort and love in his retirement years. He kept in touch with his many colleagues and students in all parts of the world by methodical correspondence. He took great satisfaction in the establishment of a Theodore Rasmussen Reading Room in the Library at the Neuro, furnished by his former residents, and in the annual Theodore Rasmussen Lecture on Neurosurgery. Ted Rasmussen will be warmly remembered by his family, friends, colleagues, students and patients, for his wisdom, modesty and gentleness. He died on 23<sup>rd</sup> January 2002 from complications of prostatic cancer.



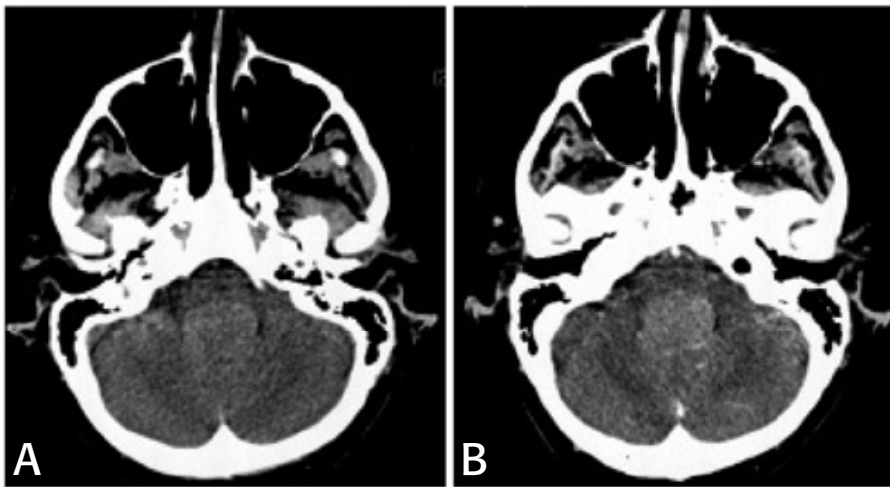
*Theodore Rasmussen, William Feindel and Wilder Penfield at the 40<sup>th</sup> Anniversary of the MNI. Dr Penfield used this photo in his book, **No Man Alone**, and commented, "When I study the photograph ... I can discover little evidence that either hard work or success has weighed very heavily upon anyone of the three directors". (1970)*



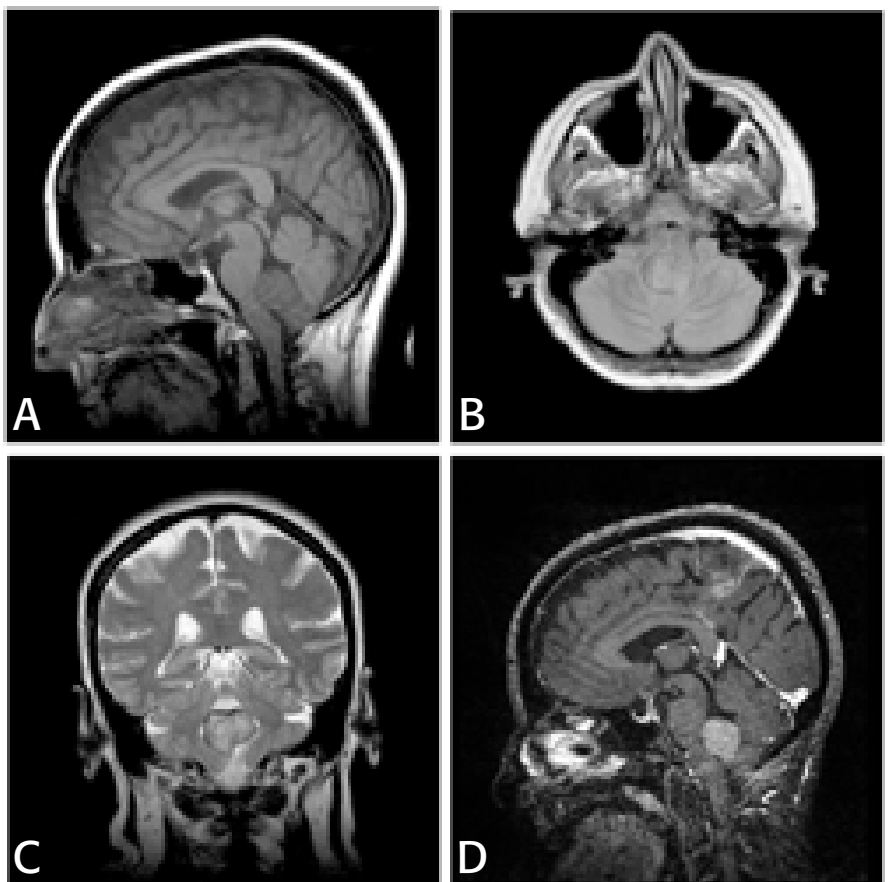
# A FOURTH VENTRICLE MENINGIOMA

DRS. MOHAMMAD ABUREMESH, MARIE-CHRISTINE GUIOT & DENIS SIRHAN

The patient is a 66 year-old lady who had a 4 year history of headache associated with nausea and vomiting, more recently having gait difficulty and balance problem. She was diagnosed and treated at the onset as Meniere's syndrome. The headache was generalized, not following certain time nor activity. Eventually a CT scan was done which showed a tumour in the region of the 4<sup>th</sup> ventricle and she was referred for MRI and surgery. On neurological examination, she was ataxic with a tendency to fall to the left, but she had no cranial nerve dysfunction, more specifically no swallowing difficulty nor dysphonation. MRI displayed a well delineated tumour within the lower 4<sup>th</sup> ventricle which could be totally removed. Histology of the lesion was typical for meningioma.



*CT plain (A) and enhanced (B) showing smooth round lesion in 4<sup>th</sup> ventricle*

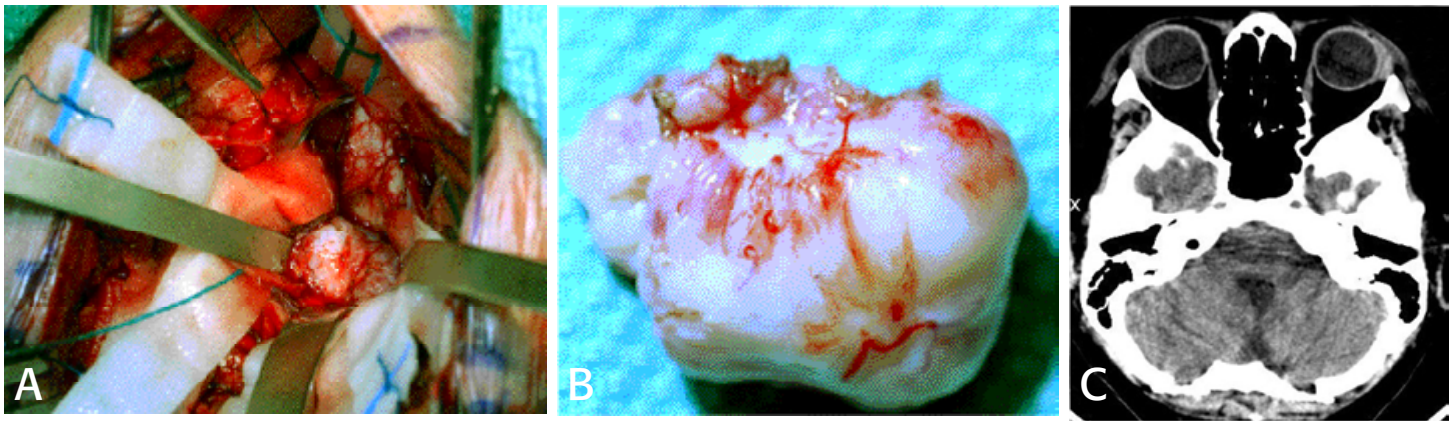


*(A) Sagittal T1; lesion slightly hypointense to adjacent brain*

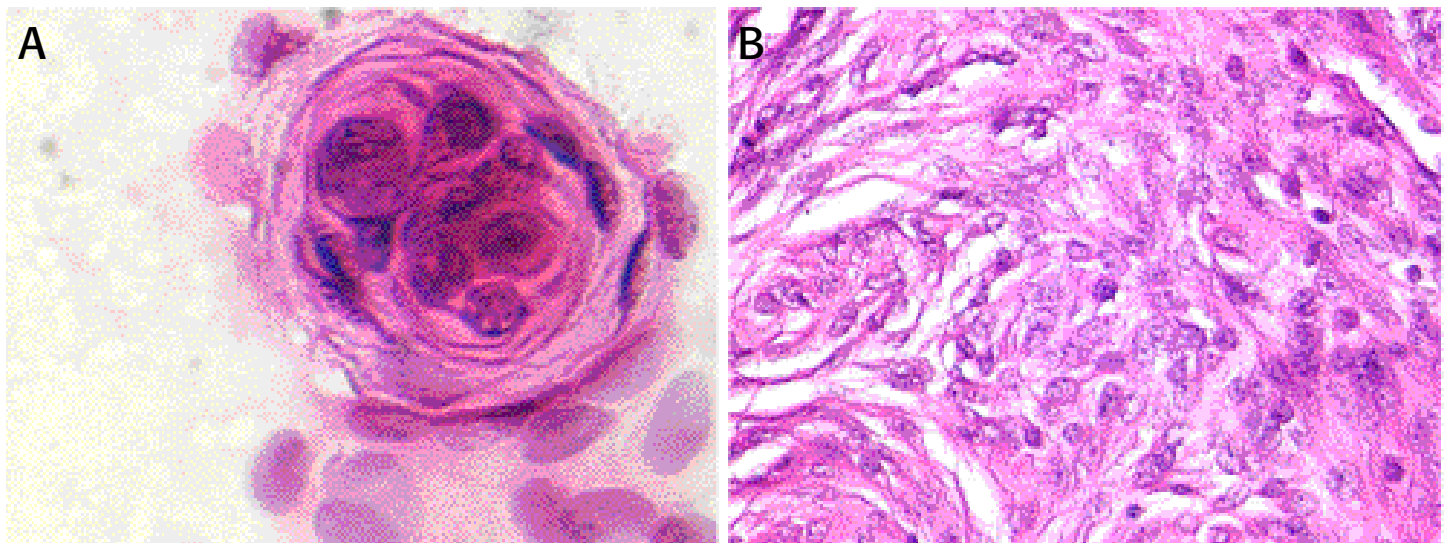
*(B) Axial Proton Density; slightly hyperintense to adjacent brain*

*(C) Coronal T2; minimal more hyperintensity than on PD with rim of hypointensity*

*(D) Sagittal Gradient T1; lesion enhances moderately with Gado.*



(A) Tumour in situ (B) Tumour removed (C) CT head post-op, no residual tumour



(A) Intraoperative smear showing typical whorl formation. (B) Hematoxylin-Eosin stain, combination of fascicular pattern and whorling.

Meningiomas arising in ventricles from choroid plexus arachnoid cells are rare (1% of all meningiomas ) and usually present in the trigone of lateral ventricles. Development from choroid elements in the 4<sup>th</sup> ventricle is very rare.

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