

CORONAL COMPUTED TOMOGRAPHY OF THE SELLA



**NEURO  
IMAGE**

THE INVESTIGATION OF  
PITUITARY ADENOMAS

Things have changed rapidly in this chapter of neuroradiology.

It is only a few years ago that the advent of polytomography had opened new hopes in the diagnosis of small adenomas. Sutton and Vézina, in a now classical paper, had described the minute erosion in the floor of the sella turcica.

Computed tomography in its early days gave little hope that it would challenge polytomography in this battle.

But this day has come. Higher resolution and thinner collimation have allowed exploration of the sellar floor as well as polytomography and even more, outlining the different densities of the intrasellar content.

In this issue, Sonny Taylor tells us about his experience in coronal computed tomography of the sella. He has been one of the pioneers in this field and is convinced that it has now replaced polytomography for good.

Most people using scanners, modern enough to do quality coronal tomography, recommend that the step of conventional polytomography be dropped and to proceed to direct coronal computed tomography.

Should a base line skull examination be done first?  
That remains unanswered!

Denis Melançon

More than 200 sellas have been studied in the coronal plane with 5 and 1.5 mm slices. The bony floor is much better seen than with A.P. polytomography. Recently 50 sellas were also studied with a prototype high contrast software program giving excellent bony spatial resolution down to 0.5 mm. This gives even more detail.

Intra, para and supra-sellar structures are extremely well seen; their visualization directly gives much more information than visualization of the floor alone with polytomes. Coronal cuts also avoid lens radiation. Variations of the sellar floor can be analyzed much better if the pituitary contents (tumour, C.S.F., normal gland) directly above are seen. A large number of microadenomas cause changes of the floor and can be picked up by polytome. But many "normal variations" have similar floor changes. With C.T., variations in size and contour of the pituitary contents also exist; and the diagnosis of a homogeneous density (iso y) upper-normal sized gland could be difficult. Infusion, plus several other major and minor criteria, plus analysing the floor below, makes this an extremely sensitive study if performed with proper technique and attention to detail. Further confusion exists when one considers that 20% of normal glands at autopsy have adenomas and the line between hyperplasia and adenoma may be thin. So, C.T. does not give the absolute answer even if the gland is well seen: but it does add an extremely new, sensitive, and powerful dimension.

Reconstruction was done in 6 very obese elderly patients using multiple 1.5 mm slices. By simple physics, reconstruction is much inferior even with the very best reformat program. The important sinus floor - sellar contents - interface cannot be seen as well with axial slices. 1.5 mm axial is not the way to "see" the floor. Also, low contrast (soft tissue) resolution will be ruined, and small structures missed. 5 mm gives less noise, better soft tissue (low contrast) resolution; but will average sinus, bone, gland and degrade spatial resolution.

Therefore, properly done direct coronals are far superior (if anyone denies this, his coronals are of poor quality). Technique of positioning (supine v.s. prone, table elevating board v.s. gantry tilt) is the most critical consideration.

Sonny Taylor  
St. Paul, Minnesota  
February 1981

EXAMPLES OF COMPUTED TOMOGRAPHY OF THE SELLA:

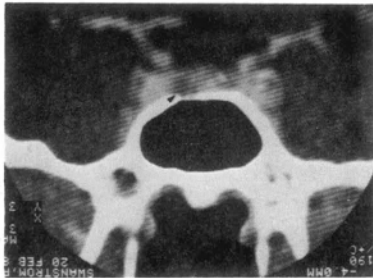


figure 1  
▶ Microadenoma

CT/T 8800

Thickness of slice: 1.5 mm  
Pixel size: 0.36mm

Direct Coronal  
Figures 1 & 2

Saul Taylor

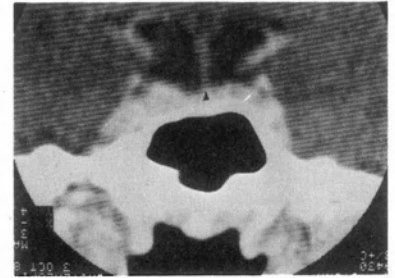


figure 2  
▶ Pituitary stalk

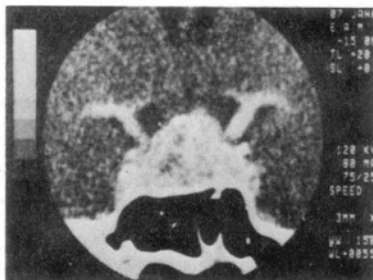


figure 3

EMI 7070

Thickness of slice: 1.5 mm  
Pixel size: 0.38mm

Direct Coronal  
Figures 3 & 4

Pituitary adenomas

Roberto Wee



figure 4

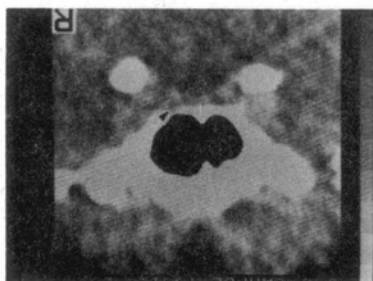


figure 5  
▶ Microadenoma

Thickness of slice: 4.0 mm  
Increment: 2.0 mm  
Pixel size: 0.38mm

Direct Coronal  
Figures 5 & 6

EMI 5005 (High Resolution)

Roméo Ethier

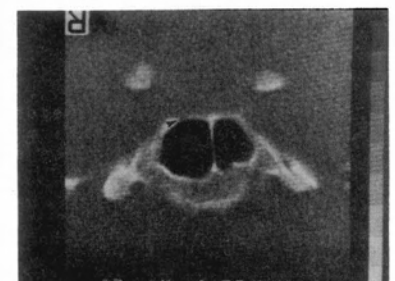


figure 6  
▶ Bone erosion

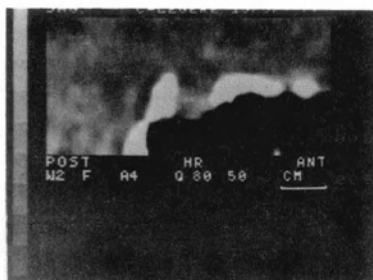


figure 7

Thickness of slice: 4.0 mm  
Pixel Size: 0.38mm

Reconstruction of axial  
Frontal & Sagittal cuts  
Figures 7 & 8

▶ Erosion of bone by microadenoma

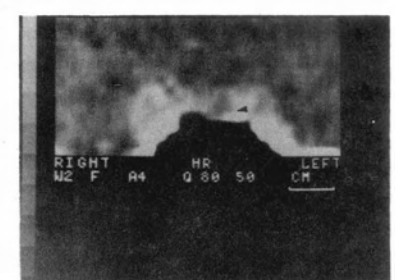


figure 8

## RADIOLOGICAL FINDINGS IN MULTIPLE SCLEROSIS

by Marvin Goldenberg.

### Findings on Angiography:

- Before the era of computerised tomography it had been reported that multiple sclerosis could give mass effect as well as abnormal vascularity resembling tumour vascularity in the acute stage. This is stated in Newton's book.

### Computerised Tomography Findings in Multiple Sclerosis:

- The most specific finding on C.T. is areas of decreased density in the white mater especially in the peri-ventricular region but also sometimes seen close to the cortex. Less specific findings include large ventricles and cortical atrophy. Some of the lesions which are of low density may enhance with contrast infusion while others are seen enhancing with contrast where no low density lesion was seen on the non enhanced study. (figure 9)

Some workers state that up to 30% of patients with multiple sclerosis have abnormalities on C.T. Most of these are just atrophy indicated by large ventricles and cortical atrophy. Fewer patients have areas of decreased density in the peri-ventricular region while very few show contrast enhancement. The findings on C.T. do not always correlate with exacerbation of the disease or the acute phase of the disease.

The spinal cord is also involved in M.S. and at autopsy usually shows a small atrophied cord. However, one case reported by Haughton showed an enlarged cord on air myelography during an acute stage of the disease with subsequent shrinking of the cord showing a small cord several weeks later. He called this the "contracting cord sign". Another case reported by Coin was C.T. of the cervical spinal cord during an acute process. This showed a normal sized cord with an area of decreased density in the cord which enhanced on infusion.

The case of the expanded cord referred to above by Haughton was the only one described in the literature with a reference to another personal communication to him of another contracting cord. Haughton feels that the cord may be involved more often in M.S. but that myelography is not done in the acute stage of the disease as a routine and therefore this sign has not been seen. (figure 10)

### References:

- Coin, C.G. et al, Cervical C.T. in M.S., Journal of C.T. no. 3 (3), 421-422, June 1979.
- Haughton, V.M., The Contracting Cord Sign of M.S., Neuroradiology, 17 (4), 207-209, April 1979.
- Haughton, V.M., C.T. Detection of Demyelinated Plaques, AJR, 132-213, February 1979.
- Prockop and Hinz, Positive Angiography of M.S. cases resembling tumour, Archives Neurology, 13-559, 1965.
- Gado, M., Annals of Neurology, 5-32, 1979.

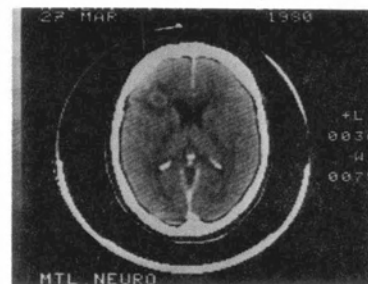


figure 9

Enhancement of left frontal plaque.

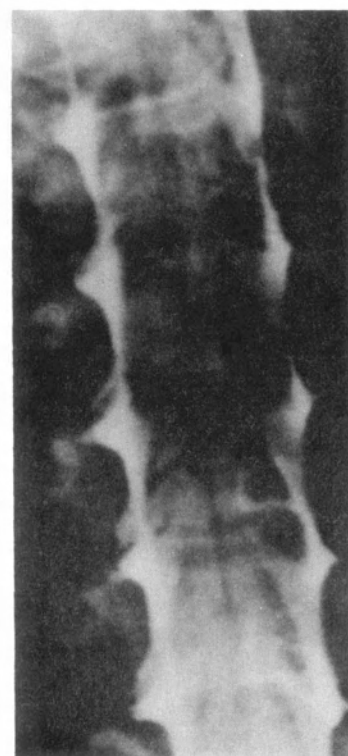


figure 10

Expansion of spinal cord in acute M.S.

## OTHER CASES PRESENTED AT THE JANUARY & FEBRUARY STUDY CLUB

by MARVIN GOLDENBERG

- . Calcified ossified lesion at the left occipital bone above and below the tentorium cerebelli with no significant brain stem compression:
  - . differential diagnosis: .. meningioma
  - .. fibrous dysplasia
  - .. osteochondroma

January 1981

by JEAN VEZINA

- . Three cases were presented where the isotope scan demonstrated metastatic lesions better than the infusion scan maybe because the total dose of iodine was not adequate.
- . Pseudo Tumour Cerebri.
  - . discussion of investigation.

January 1981

by GUS O'GORMAN

### Case I:

Epignathus or fetal teratoma arising from the skull base filling the buccal cavity and protruding from the mouth.

Protruding mass had multiple teeth and also had a hard palate situated below large defect in the patient's hard palate. A round defect was seen in the sphenoid bone. At surgery from the nasopharyngeal side no CSF communication was encountered.

- Reference:
1. The Broderlands of Embryology and Pathology R.A. Willis (1953), pg. 434.
  2. Teratoma of the face associated with a patent canal extending into the cranial cavity (Rathke's Pouch) 3 week old child. Wilson and Gehweiler, Journal of Pediatric Surgery Vol. 5, pg. 349, 1970.

### Case II:

Cerebral venous angioma in a patient with neurofibromatosis. Fifteen year old boy had a CT Scan with infusion as part of evaluation for neurofibromatosis. Incidental punctate area of increased density with contrast medium was seen. Angiography revealed this to be a venous angioma. The patient was asymptomatic relative to this finding.

### Case III:

Cystic lymphangioma of the orbit in a seven year old.

February 1981

by ROBERTO WEE

- . Cystic adenoma (6mm) with a well vascularised enlarged pituitary gland.
  - . Questions raised:
    - .. Are the cysts sequelae of small hemorrhages ?
    - .. To what extent does the gland blush in normal cases ?

- . Normal looking gland in a patient with infertility and amenorrhea.
  - . At surgery 4mm nodule removed.

- . Acromegalic and right-sided microadenoma with appropriate slanting floor of sella.

January 1981

by MARVIN GOLDENBERG

Carotid aneurysm thrombosis in neck.

- . Where diagnosis was suspected from CAT Scan but not from angiography.

February 1981

by ROBERTO WEE

- . Endometriosis sciatic nerve.
- . Wybur Mason syndrome.
- . Suprasellar cyst probable arachnoid origin.

February 1981

by DENIS MELANCON

- . A large sagittal meningioma with it's multiple feeders.
- . Hypothalamic myoblastoma.

February 1981

by SAUL TAYLOR

- . A case of Sheehan's syndrome with correlation on coronal computerised tomography of the sella.  
presented by Denis Melançon

February 1981

## CORRESPONDANCE:

In answer to our letter in Vol.2 no.1, page 2.

### SEQUESTRATION OF THE FOURTH VENTRICLE

" I think that the entity that you have observed should probably be defined as a "disproportionately large, partially isolated fourth ventricle, communicating with CSF spaces distally blocked " ! that is quite a cumbersome definition but including almost all the facts. "

" I have not seen or read of this condition before, although it seems to me theoretically quite possible and one of the steps of the sequences of events that may occur following inflammation or infection of the subarachnoid spaces and ventricles. "

" The question is: Could a shunt in the fourth ventricle be of any help ? "

Giuseppe Scotti  
Milano, 27.1.81