evidence of communication between cyst and fourth ventricle. The supratentorial ventricular system seemed to be normal. Computerised tomography and digital vertebral angiography were non-contributory.

A right retromastoid craniotomy was performed with the patient in the supine position and head turned to the left. After incision of the dura and cerebellar retraction, a large cystic mass with a thick wall appeared. The rostral pole reached the seventh and eighth cranial nerves. The caudal pole extended to the first cervical root. The ninth, 10th, and 11th cranial nerves were stretched downward. The cyst did not communicate with either the fourth ventricle or subarachnoid spaces. Incision of its wall immediately produced collapse of the cyst and relaxation of the nerves; the underlying brainstem seemed severely distorted. The operation showed significant reduction in the size of the cavity.

One year later, there was a significant improvement in the glossoopharyngeal palsy and the disappearance of rhinolalia, and MRI showed resolution of the cyst (figure, right).

Histological examination showed the cyst wall to be composed of two distinct layers; the inner layer of neuroglial tissue and the outer of fibrous tissue. The luminal surface was lined by cuboidal epithelium of ependymal origin.

According to Morimura,3 our patient's cyst should be described as a glioependymal cyst thereby emphasising its developmental and heterotopic origin and its neuroepithelial nature. Three previous reports have described glioependymal cysts of the cerebellopontine angle cistern, two of which were symptomatic and were treated successfully by surgical marsupialisation or fenestration, keeping the wall in situ, as we have done for our patient, with good long term relief of symptoms.

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Double intraspinal enterogenous cysts

An enterogenous cyst in an intramedullary or intradural extramedullary location in the ventral cervicodorsal spinal canal may be a cause of spinal cord compression. Embryologically, the cyst derives from endodermal tissue displaced dorsally into the spinal canal ventral to the neural plaque through the interposed mesodermal layer that forms the vertebral bodies.1 Among 63 histologically verified cases of enterogenous cysts in the English literature, the case reported here is the only one that has been found with double cysts.

A 30 year old man presented with a history of weakness and atrophy of intrinsic muscles confined to his right hand for 15 years. He had neither history suggestive of poliomyelitis nor relevant sensory dysfunction before developing the present illness. The symptoms showed no progression until one year before admission when atrophy of his left hand and paraesthesia over his chest and right leg insidiously developed.

Needle electromyography showed chronic denervation over muscles innervated by C7-T1 roots with absent volitional activity over C8-T1 roots. The compound muscle action potential was absent over the right abductor pollicis brevis and abductor digitii minimi whereas sensory nerve coordination in his right arm was normal.

Lateral radiographs of the cervical spine showed widening of the anteroposterior diameter of the cervicothoracic junction. Magnetic resonance imaging of the cervical

Figure 1 Composite photographs of two MR images in axial view (right) and sagittal view in T1 weighted sequence (left). The spinal cord has been displaced posteriorly by two separate enterogenous cysts (arrows).

Figure 2 Composite photographs of sections from the cyst. (A) Histological appearance showing that the cyst wall is composed of connective tissue lined by a single layer of ciliated and non-ciliated columnar epithelium (haematoxylin and eosin, originally × 260). (B) Intracytoplasmic mucin can be identified in the epithelial cyst lining (diastase pretreated periodic acid Schiff reaction, originally × 165). (C) The cystoplasm responds positively to carcinoembryonic antigen (CEA) staining (anti-CEA, originally × 220).
spine disclosed two intradural extra-
medullary masses located anterior to the
spinal cord at the C7-T1 level displacing the
cord posteriorly. These two masses had a
higher intensity compared with CSF on both T1 and T2 weighted
sequences (fig 1).

The patient was subjected to C6-T1 laminectomy. Before opening the
dura, intraoperative sonography showed two sep-
ate cystic lesions. After severing the den-
tate ligaments, the spinal cord was
retracted, exposing the cysts. The one
behind the C7 vertebra was attached to the
pia of the cord, was ovoid in shape, and
partially invaginated into the cord. The sec-
cond cyst, behind the T1 vertebra, was
attached to the dura anteriorly and was pul-
satile. It caused no obvious cord compres-
sion. These two cysts were extracted and
excised from their attachments using an
operating microscope.

The patient made an uneventful recov-
ery. The paraparesis over his chest and
right leg disappeared shortly after the opera-
tion, whereas weakness and atrophy of both
his hands showed gradual but steady
improvement during follow up to six months
after the operation.

Each cyst measured 1-5 cm in diameter,
had a light blue tint, and contained milky
fluid. Histologically, both cyst walls were
composed of connective tissue lined by a
single layer of ciliated or non-ciliated
columnar epithelium. Intracytoplasmic
mucin was identified in some of the epithe-
llial lining with alcin blue and mucicar-
mine, and was positive to a diastase
pretreated periodic acid Schiff (DPAS)
reaction. Carcinoembryonic antigen was
demonstrated immunohistochemically in
these cells (fig 2). As the enteric tract is
positive for this stain from the second to the
sixth month of fetal development, Miyagi
et al have reported that the epithelial cells
of intraspinal enterogenous cysts respond	positively to staining for carcinoembryonic
antigen.

Intraspinal enterogenous cysts usually
affect young men more than women. They
have been found more often in the cervical
than in the thoracic or lumbar region. They
usually occupy the intradural extra-
medullary space. The initial clinical mani-
festations of our patient were weakness and
atrophy of the intrinsic muscles of his right
leg for 15 years without any sensory
involvement, clinical features rarely seen in
the previously documented cases. Woo and
Sharr have subgrouped the cysts into two
types—the developmental type usually
located anterior to the cord in the cervical
region and the teratomatous type usually
located posterior to the cord around the
conus.

Intraoperative sonography showed not
only the extent of cord compression, but
also the coexistence of a second cyst, which
might not have been easily seen during the
operation especially when the cyst is ante-
riorly located and invaginated into the
cord.

Craniohypophysegna: early and long
term recurrence after partial removal

There continues to be controversy over
whether a craniohypophysegna is best treated
by total radical removal or by partial
removal combined with evacuation of any
cyst. There is a paucity of data document-
ing long term survival after 10 years. In this
clinic 65 cases of craniohypophysegna have
been treated since 1950, by partial removal
and cyst evacuation with no total remova-
l.

Twenty nine cases survived more than five
years and the cause of death, time to recur-
rence, and use of further surgery and radio-
therapy have been documented in those
surviving for more than and less than 10
years. All cases were histologically verified.

Ten cases died within the first year, either
during the operation or in the early postop-
erative period. Twelve cases were lost to fol-
low up and 14 cases with less than five years
of follow up were excluded from this study.

There was a uniform surgical technique
of puncture and aspiration of the cystic
component followed by partial removal of
the tumour capsule through a subfrontal
approach on the right or non-dominant
side. The capsule was removed as much as
possible within the operative field, but trac-
tion of the capsule was not attempted, to
avoid damage to the hypothalamic area.

Hence, the capsule of the posterosuperior
aspect where it attaches to the hypothala-
mic surface was preserved. Visible tumour
tissue was removed as much as possible, but
hard or invisible tumour tissue was not
removed intentionally. Calcification of the
tumour was sometimes removed. When
recurrence or enlargement of the residual
tumour caused such neurological signs as
increased intracranial pressure and visual
deterioration, reoperation with or without
radiotherapy or chemotherapy was per-
formed if possible; in one patient, four
times.

To investigate the proliferative poten-
tial of patients surviving for less than or more
than 10 years, the silver colloid staining
method for nuclear organiser regions (Ag-
NORs) was used as it can be performed on
fixed paraffin embedded sections. Briefly,
the staining solution was prepared by dis-
solving gelatin in 1% aqueous formalic acid
at a concentration of 2% and mixing with
twice the volume of 50% aqueous silver
nitrate solution. Paraffin sections (6 μm)
were incubated in the staining solution at
room temperature for 30 minutes in a dark
room. The Ag-NORs were then counted
under oil immersion at 1000-fold magnifi-
cation. The NOR number was determined as
the mean number of Ag-NORs per 200
tumour cells.

Tables 1 and 2 summarise the
individual patient data of those surviving between five
years and 10 years.
Double intraspinal enterogenous cysts.

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