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ANTERIOR FLOOR MENINGOENCEPHALOCELES SURGICAL TREATMENT

EXPERIENCE BASED ON ELEVEN CASES

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Since Richter (1813) who for the first time reported a case of anterior floor meningoencephalocele (MEC), several authors theorized its etiology and pathogenesis, describing the clinical conditions with details, suggesting therapeutic measures.

This paper's purpose is to describe our surgical treatment experience in five patients using the extradural intracranial pathway, comparing the results to those mentioned in the literature and other six cases, operated in the same surgical department using different techniques.

CASUISTIC AND RESULTS

The treatment of eleven patients with anterior floor MEC is analysed (Table 1); the first six cases were investigated revising existing data in the Hospital das Clinicas of São Paulo, between 1950 and 1968. The remaining five patients were treated by us from 1968 until the present date.

The surgical technique used in the last five cases consisted of: bifrontal craniotomy following a coronary excision of the skull, reaching the MEC by extradural approach. After lifting both frontal lobe it could be noticed the duramater and herniated encephalic parenchyma, the periosteum removed from the craniotomy bone flap was grafted, with the purpose of making the dural defect the most possibly impermeable. Following, the cerebral tissue invaginated in the bone defect was excised, placing the bone graft removed from the craniotomy flap and temporal muscles pieces trying to make tamponment of the entire abnormal opening. Afterwards a recomposition was made of the several surgical layers.

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Some slight alterations of the described techniques occurred due to the MEC anatomical differences. In one patient (n.º 7), the craniotomy was bifrontal in two flaps with the purpose of protecting the upper longitudinal sinus and the duramater plastic surgery was performed with homologous graft preserved in glycerin; in another case (n.º 10) the nasal region corrective surgery was performed concomitantly with the craniotomy (Fig. 1).

In two patients (cases 8 and 11) it became necessary to install a ventricle-peritoneal derivation with interposition of a Holter valve due to the hydrocephaly decompensation. Two other cases (7 and 8) required nasal esthetic surgery.

Regarding the first six cases, the following facts occurred; patient case n.º 1 did not undergo surgery because of death due to meningoencephalitis post MEC diagnostic puncture; patients n.º 2 and 3 were operated by extracranial pathway, presenting a post-operative greatly disturbed, bad surgical and esthetic results; patients n.º 4, 5 and 6 were operated by the intradural intracranial pathway; only one survived (n.º 4); the others died within 48 to 96 hours following surgery due to convulsion and bronchopneumonia.

Table 1 presents identification data on the eleven patients, MEC varieties, surgical treatment employed, post-operative follow-up and results.

Case	Name	Age	Sex	MEC varieties	Surgery	Follow	Results
1	VL	21 d	F	NF	—	—	Death
2	LAS	11 m	M	NF	EC	1 a	Precarious
3	EJS	3 m	M	NE	EC	—	Bad
4	SMM	11 m	F	NE	ICID	6 a	Good
5	MMM	2 m	F	FE	ICID	—	Death
6	AB	2 m	F	FE	ICID	—	Death
7	AMM	34 a	F	NE	ICED	6 m	Good
8	NGM	29 d	M	NE	ICED	—	Good
9	MFPF	2 a	F	NE	ICED	14 m	Good
10	CSA	3 a	M	NE	ICED	28 m	Good
11	FCS	6 m	M	EO	ICED	6 m	Good

Table 1 — The 11 patients identification, MEC varieties, surgical treatment applied, post-operative follow-up and results. Abbreviations: a, year (s) — d, days — EC, extracranial — EO, sphenorbitaru — F, female — FE, fronteethmoidal — ICED, intracranial extradural — ICID, intracranial intradural — m, months — M, male — NE, nasoethmoidal — NF, nasofrontal..

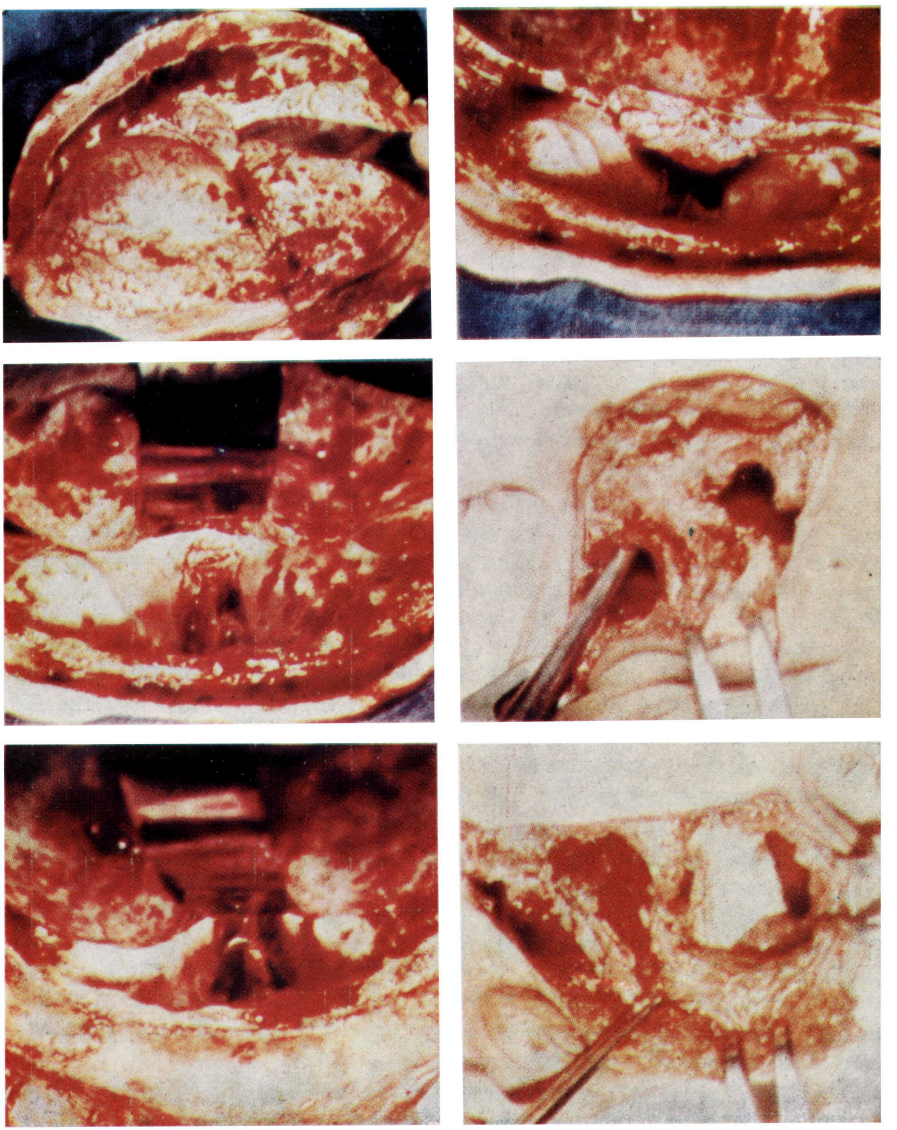

Fig. 1 — C.S.A. (case 10). The photography series shows the primary surgical steps. It can be noticed a bilateral bone defect in the cribriform plate site of the ethmoid bone after the MEC excision, besides evident intercomunication between nasal cavities and the ethmoidal bone defect, indicated by the dural elevator. Note the bone grafts placed in the ethmoidal and nasal regions.

DISCUSSION

Mc Gillicudy [8] Gisselsson [5] Anderson [2], Moore [9], Walker et al. [13] call attention to great many badly succeeded cases, when operated by extracranial pathway. The primary conclusions reached after study of these papers are the following; the extracranial approach provokes MEC free communication with badly infected nasal cavity; the MEC pedicle may rarely be entirely dissected, by the pathway approach, which impairs its closing, causing post-operative fistulae; the MEC remnants that remain when the extracranial approach pathway is used, are sufficient to provoke constant compression over the adjoining bone structures, establishing its abnormal development; the extracranial approach may result in a antiesthetic facial scar.

Dodge, Love and Kernohan [4], among others, reffer to the following advantages in the use of the intracranial approach pathway; surgical procedures performed in a sterile field; better exposition of the dural and bone openings; MEC's greatly resection possibility; better facility for a safer dural and bone repairing, preventing the occurrence of meningitis and rhinoliquorrhea; abscense of herniation recurrence.

The consulted authors agreed unanimously that the MEC surgical treatment primary purpose should be the duramater impermeable closing, being indifferent the utilization of sliding grafts, preserved homologous duramater fragments, fascia lata, muscle, polyethylene sheets. In a same way, the bone defect correcttion may be obtained with the use of a large variety of materials; bone autografts, homograft, oxicel, vitallium plates, tantalum, stainless steel, methyl-methacrylate, plexigaz, polyethylene, the choice being based on the local conditions at the time of surgery, size of the bone defect and the surgeon's preference. Nevertheless, Derome et al. [3], Guiot, Rougerie and Tessier [6] and Tessier et al. [12], support enthusiastically the use of dermal grafts for dural repair and iliac spongeous bone superposed layers for the closing of the bone defect.

Concerning the intracranial approach of the MEC anterior floor, the majority of authors use the intradural pathway. Jacob [7], does not advise the extradural pathway due to difficulty in processing the duramater displacement from the floor of the anterior fossa; Anderson [2], Walker, Moore and Simpson [13] and Dodge, Love and Kernohan [4], always operate using the intradural pathway. Nevertheless, Adrianjakovo and Pialoux [1] sustain that the results do not depend on the intra or extradural pathway. Zverev [14], Oblu et al. [10] and Swanwela et al. [11], favour the extradural pathway

The MEC anterior floor was rectified by extra approach in two of our patients (cases 2 and 3). We consider the results as precarious and bad, respectively. In the first case, an LCR fistula occurred after surgery, as well as bulging of the operated site In the second case, only bulging occurred, followed by enlargement of the cranial circumference. It is possible that in the two cases the hidrocephaly decompensation, due to the MEC exeresis, played an important role in the surgical unsatisfactory results. These unfavourable results corroborate our experience, the extracranial approach deficiency for treatment of the MEC anterior floor.

Among the 8 patients in which the MEC was approached by intracranial pathway, in 3 of them (cases 4, 5 and 6) such approach was intradural and in 5 (cases 7, 8, 9, 10 and 11), extradural pathway. From the ones operated by intradural pathway, 2 (cases 5 and 6) died in the immediate post-operative with convulsions and respiratory problems; the only survivor (case 6) did not present immediate complications, presenting after 3 years, intracranial hipertension symptomatology due to a leptomeningeous cyst. From the 5 patients operated by extradural pathway, only in one case (case 8) was noticed hydrocephaly decompensation after surgery. But in this case, the hydrocephaly had already been decompensated before the MEC correction, becoming necessary the placement of a ventricle-peritoneal derivation with Holter valve, removed afterwards due to meningoencephalitis. This fact proves that it was probable a case of hydrocephaly in the utmost compensation point of limit. In the other 4 patients no neurological complication was noticed, even in cases 10 and 11, that presented hydrocephaly, corroborated by the pneumoencephalogram; patient F. C. S. (case 11), was operated on urgency due to a LCR fistula provoked by the MEC rupture.

In our point of view, the cerebral cortex lesion due to direct manipulation in the intradural approach, may be, at least in part, responsible for the convulsions noticed in cases 5 and 6. These were noticed in only one of the patients operated by extradural pathway (case 11) but were easily managed

Although the bibliographic revision has shown that the majority of surgeons elect the intradural intracranial pathway, we believe it presents disadvantages over the extradural one The cerebral cortex trauma is minimized through the duramater protection, turning the post-operative less disturbed, possibly by the abscence or small degree of the cerebral edema. Besides, the correction of the bone and dural defects is favoured by better exposition of the MEC region This is due to the fact that the frontal lobes, being displaced in the postero-superior direction, protected by its dural involucre, allows large access to the MEC pedicle, as well as to the anterior fossa floor, with a minimum cerebral trauma.

The closing of the dural defect using craniotomy periosteum flaps and of the bone opening, with bone fragments of the same flap was quite satisfactory. It was not necessary to employ other materials unless in case 7 (preserved dura-mater).

We do not doubt the good results mentioned by several other authors using intradural approach. Nevertheless, according to our experience it becomes evident that the extradural pathway provided better results rather than the intradural and extracranial approach.

Patient V. L. (case 1) did not undergo surgery because of death due to meningoencephalitis caused by puncture for the diagnosis of the MEC, confirming definitely what is alerted in the literature: puncture for differential diagnosis should always be avoided due to risk caused by cephalorachidian fistula and/or meningoencephalitis.

It is our opinion that the MEC anterior floor correction should be performed by a team formed by neuro and plastic surgeons, performing simultaneously the intra and extracranial stages (fig. 1) as done in case 10. The MEC extirpation in one stage, besides sparing to the patient another surgery and anaesthesia, allows better protection to the bone graft, that remains much firmly attached.

The remaining MEC necrosis, that persists following partial extirpation through intracranial pathway, due to the section of the vascular pedicle, provokes fibrosis and adherence to the cutaneous layers, impairing the ulterior surgery, worsening the esthetic results When the MEC correction is performed in only one surgical stage, the dural defect should be repaired prior to the beginning of the extracranial stage, in order to avoid infection of the subarachnoidal space.

CONCLUSIONS

1. The pathway approach for the anterior floor meningoencephalocele treatment should be intracranial.

2. It is our opinion that the extradural intracranial pathway approach is of preference to the intradural.

3. Preferentially, the correction of anterior floor meningoencephalocele, should be performed by a team formed by neuro and plastic surgeons, so that the malformation should be totally excised in one unique surgical stage.

4. The anterior floor meningoencephalocele correction should be made as early as possible, without limit of age for this purpose.

5. The puncture for differential diagnosis should be avoided due to the risk of provoking a cephalorachidian fluid fistula and/or meningoencephalitis.

SUMMARY

The authors relate their experience in the anterior floor meningoencephaloceles surgical treatment, excised by the intracranial pathway and extradural approach. They compare their results on five cases operated according to this technique, with other six cases treated in the same Department using other surgical procedures and with those in the literature.

RESUMO

Os autores relatam sua experiência no tratamento cirúrgico da meningencefalocele do andar anterior, excisada por via intracraniana e abordagem extradural. Comparam os resultados de cinco casos operados de acordo com esta técnica com outros seis casos tratados na mesma Clínica, usando outros procedimentos cirúrgicos e com os constantes da literatura.

REFERENCES

1. ADRANJAKOVO, J. & PIALOUX, P. — Aperçus sur les méningoencèphalocèles anterieurs. A propor de 9 cas. Ann. Otolaring. 85:687-696, 1968.
2. ANDERSON, F. M. — Intranasal (sphenopharyngeal) encephalocele: a report of a case with intracranial repair and a review of the subject. Archs Otolaring. 46: 644, 1947.
3. DEROME, P.; AKERMAN, L.; BAMBERGER-BOZO, C.; BOUCHE, J.; BRION, S.; FRECHE, C.; GUIOT, G.; HERTZOG, E.; JEDYNAK, C.; KERAVEL, Y.; OZUN, G.; RIVIEREZ, R.; ROUGERIE, J.; TESSIER, P. & VOURCH, G. — Les tumeurs spheno-ethmoidales: possibilités d'exérèse et de reparation chirurgicales. Neuro-Chirurgie 18 (suppl.): 1-164, 1972.
4. DODGE, H. W. Jr.; LOVE, J. G. & KERNOHAN, J. W. — Intranasal encephalomeningoceles associated with cranium bifidum. Arch. Surg. 79:75, 1959.
5. GISSELSSON, L. — Intranasal forms of encephalomeningocele. Acta otolaring. 35:519, 1947.
6. GUIOT, G.; ROUGERIE, J. & TESSIER, P. — La greffe dermique: procédé protection cerebro-meningée et de blindage duremérien. Ann. Chir. plast. 12:93, 1967.
7. JACOB, J. B. — Les méningo-encéphalocèles antérieures de la base du crâne. Maroc. méd. 40:73, 1961.
8. Mc.GILLICUDDY, O. B. — Encephalomeningoceles in the nasal cavities. Ann. Otol. Rhinol. Lar. 51:516, 1942.
9. MOORE, P. M. — Intranasal encephalomeningocele: report of a case. Trans. Amer. Lar. Rhinol. Otol. Soc., 50th Meeting, Cleveland, 1952, pp. 481-502.
10. OBLU, N.; SANDELESCU, G. & RUSU, M. — Meningoencephalocelul anterior al bazei craniului. Oto-rino-laringologie 14:147, 1969.
11. SWANWELA, C. & HONGSAPRABHAS, C. — Fronto-ethmoidal encephalomeningocele. J. Neurosurg. 25:172, 1966.
12. TESSIER, P.; GUIOT, G.; ROUGERIE, J.; DELBET, P. & PASTORIZA, J. — Ostéotomies cranio-naso-orbito-faciales. Hypertélorisme. Ann. Chir. plast. 12: 103, 1967.
13. WALKER, E.; MOORE, W. W. & SIMPSON, J. R. — Intranasal encephaloceles; survey of problem with recommendations for reducing mortality. Arch. Otolaring. 55:182, 1952.
14. ZVEREV, A. F. — Evaluation of several techniques in the treatment of the meningoencephaloceles. Khirurgiye (Moskwa) 32:60, 1956.

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