

Facial nerve decompression in Bell's palsy by middle cranial fossa approach – a single-center case series

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Abstract

Bell's palsy is a facial paralysis of unknown origin with variable outcomes. Surgical decompression of the facial nerve is considered as an option in cases of complete paralysis. Many approaches have been proposed but the middle cranial fossa approach has been shown to be the most convincing. This procedure is not yet widely recommended due to the lack of large studies. Based on a unique case, we aim here to document the benefits of the surgery.

This is a retrospective case study of 24 patients with complete Bell's facial paralysis covering a period of 15 years of practice. The facial nerve decompressions were done in a tertiary care center.

Results showed that 60 % of patients recovered to a House-Brackmann (HB) grade I and II. No statistically significant difference was noted between patients who were operated before and after 14 days on onset of the paralysis ($p > 0.05$). No patients had major and permanent complications. Results also showed that women recovered better than men after the surgery (HB 2.08 ± 0.64 & 2.83 ± 0.83 ($p < 0.05$), respectively).

This study has the largest case series in a single institution. It shows that patients undergoing facial nerve decompression via the middle fossa approach have a good chance of recovery.

Background

- ▶ Bell's palsy is characterized by a sudden onset of unilateral and peripheral facial paralysis of unknown etiology.
- ▶ The incidence is 23 cases per 100 000 population.
- ▶ Accepted hypothesis for the etiology: viral infection.
- ▶ Pathophysiology: Its anatomical configuration with part of his path in a narrow bony canal limiting the space to accommodate putative inflammation.
- ▶ Surgical decompression is an option for failed medical treatment in cases of severe or complete refractory facial paralysis.
- ▶ Targeting the narrowest point of the facial nerve pathway at the meatal foramen, the junction between the internal auditory canal and the labyrinthine portion, the middle cranial fossa approach is the one that has demonstrated the more convincing results.

Materials and methods

- ▶ Retrospective case study 25 cases of facial nerve decompression for Bell's palsy by middle cranial fossa approach
- ▶ From 1998 to 2013
- ▶ Hôpital de l'Enfant-Jésus, a Laval University teaching hospital
- ▶ Clinical course was evaluated with the House-Brackmann grade



Figure 1. Management of studied patients with complete facial paralysis from Bell's palsy.

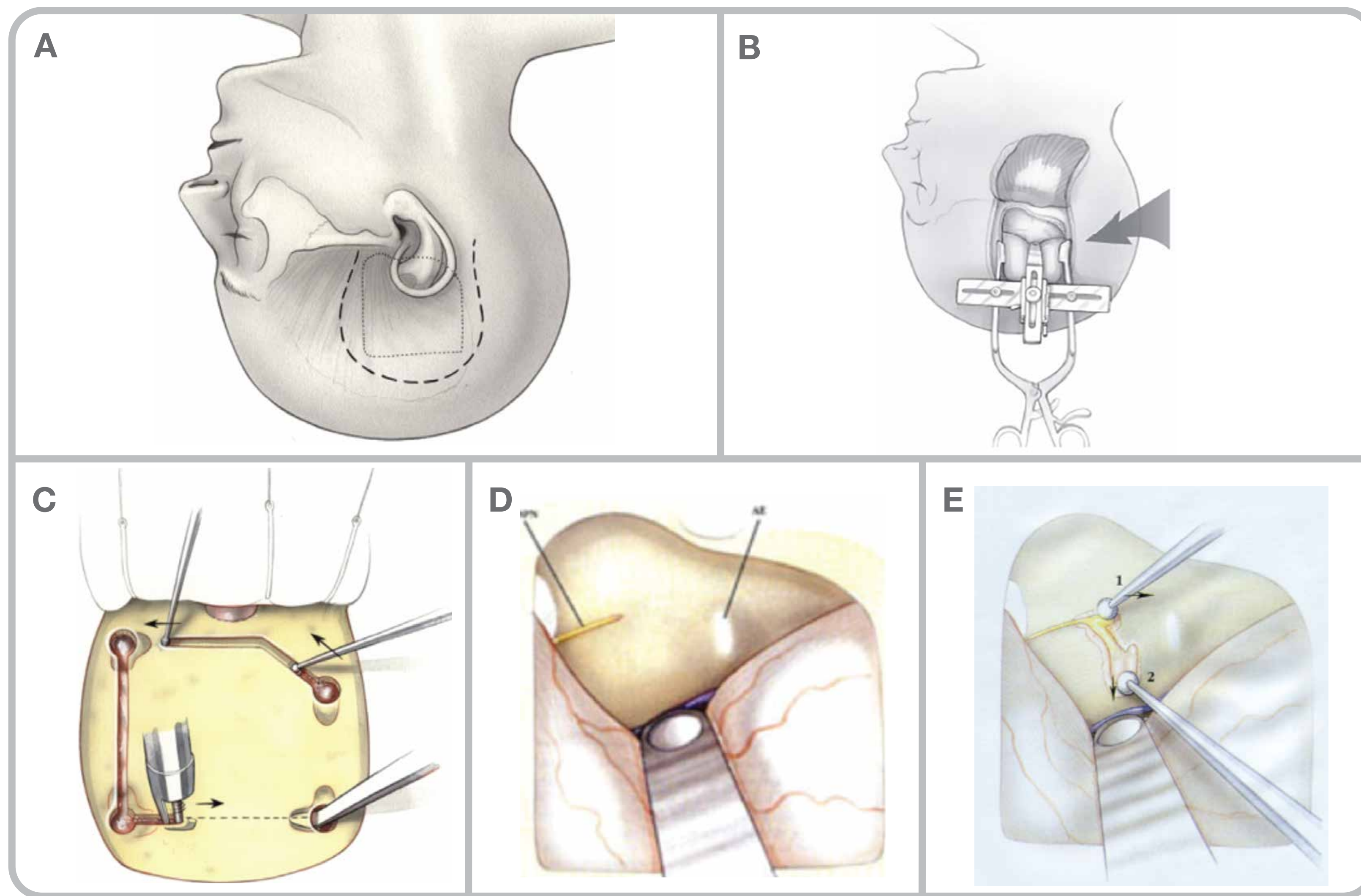


Figure 2. Middle fossa approach for facial nerve decompression. A- "C" incision up to the superior limit of the temporalis muscle. B- A periosteum flap is raised. C- Craniotomy. D- Landmarks are the greater petrosal nerve and the arcuate eminence. E- Exposition of the nerve at its geniculate, labyrinthine and tympanic segments. Nerve sheath is incised.

Discussion

- ▶ This is the largest case series of facial nerve decompression by middle cranial fossa approach conducted in a single tertiary-care center.

Studies		Number of cases	HB I	HB II	Total
Gantz et al. (1998)	Multicentric	37	41.2 %	50 %	91.2 %
Cannon et al (2014)	Single center	15	35.7 %	35.7 %	71.4 %
Do et al (2016)	Single center	25	8 %	52 %	60 %

Table 3. Comparison to other studies. The study by Gantz et al. had 36 patients with complete facial paralysis who did not undergo surgery. 42% of them recovered to a HB grade of I and II. Our study remains superior to the conservative approach.

- ▶ Studies have shown benefits of operating within 14 days of the beginning of the paralysis. Reasons such as nerve viability and the ratio of benefits-risks are in cause. No statistically significant difference was seen between the group operated within 14 days and the > 14 days group. This is probably due to our small population size and the few cases in our >14 days arm.
- ▶ No major complications were reported in our cohort. By following most of them for more than 12 months, none of our patients reported permanent damage to their well-being.

Results

	Mean ± SD
Age	49.16 ± 13.71 (n=24)
	Male 52.17 ± 14.49 (n=12)
	Female 46.38 ± 12.89 (n=12)
Side of paralysis	n
	Right 15 (60 %)
	Left 10 (40 %)
ENoG	n
	Complete nerve degeneration 15 (60 %)
	Severe nerve degeneration 10 (40 %)
Time	Mean ± SD
	Beginning of symptoms and surgery 15.04 ± 10.06
	Beginning of symptoms and the referral to ENT 10.32 ± 9.86
	Referral to ENT and surgery 4.52 ± 3.47

Table 1. Demographics

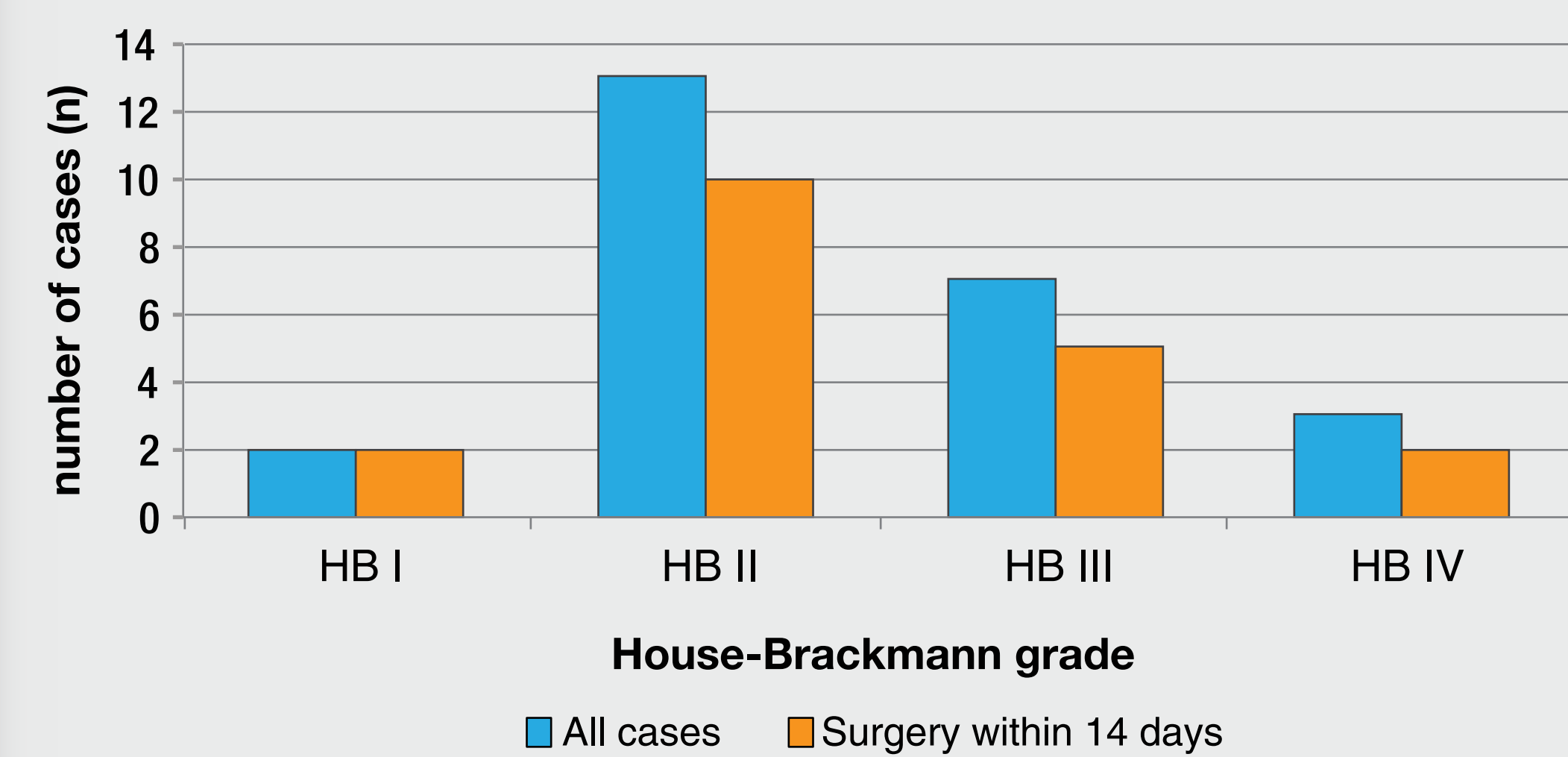


Figure 3. Facial function recovery post-surgical decompression. No statistical difference ($p > 0.05$) was noted between the group operated within 14 days and after 14 days of symptoms apparition.

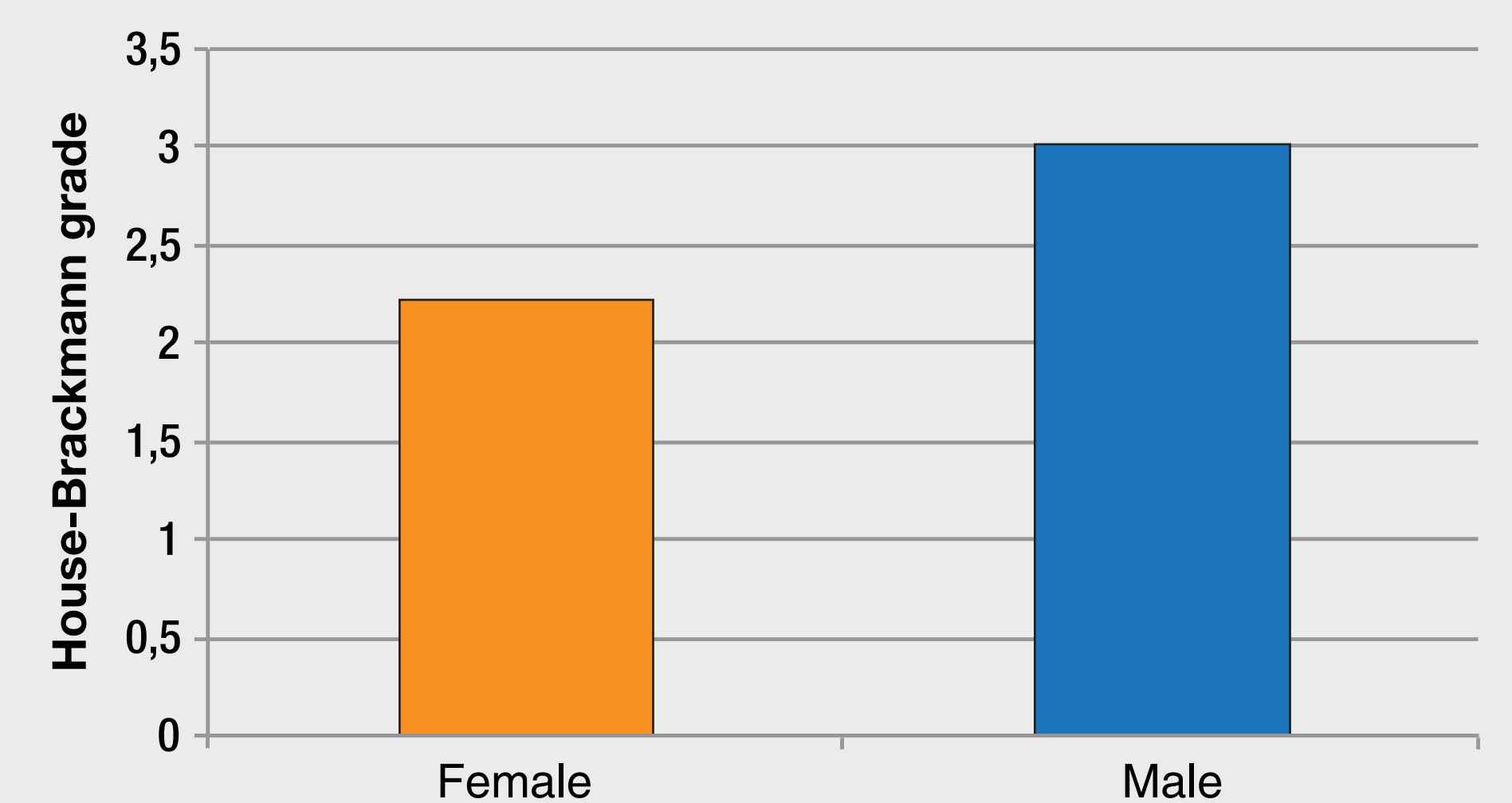


Figure 4. Mean recovery grade by gender. In the female group, the mean recovery grade was 2.08 ± 0.64 and in the male group, it was 2.83 ± 0.83 ($p = 0.0466$).

	n (% of total)
Cochleovestibular	9 (36)
Vertigo with nystagmus	4 (16)
Dizziness	1 (4)
Conductive hearing loss	1 (4)
Sensorineural hearing loss	2 (8)
Tinnitus	1 (4)
Others	2 (8)
Frontal Hematoma	1 (4)
Hemotympanum	1(4)

Table 2. Complications. No major complications resulting in permanent damage were reported. All recovered within 3 months.

Conclusion

- ▶ This study has the largest case series in a single institution. It shows that patients undergoing facial nerve decompression via the middle fossa approach have a good chance of recovery
- ▶ Moreover, this procedure does not yield high complications, which accounts a lot in the benefit-risk ratio.
- ▶ Surgical decompression is reserved for severe cases of facial paralysis and is generally performed within 14 days.

References

- ▶ May M, Klein SR, Taylor F. Indications for surgery for Bell's palsy. Am J Otol 1984; 5:503.
- ▶ Katsic SK, Beard CM, Wiederholt WC et al. Incidence, clinical features, and prognosis in Bell's palsy. Rochester, Minnesota, 1968-1982. Ann Neurol. Nov 1986;20(5):622-7.
- ▶ McCormick DP. Herpes-simplex virus as a cause of Bell's palsy. Lancet 1972; 1:937.
- ▶ Grose C, Feorino PM, Dye LA, et al: Bell's palsy and infectious mononucleosis. Lancet 1973; 2:231.
- ▶ Engstrom M, Berg T, Sjöerquist-Desathik A, et al. Prednisolone and valaciclovir in Bell's palsy: a randomised, double-blind, placebo-controlled, multicentre trial. Lancet Neurol 2008;7:993Y1000. 13.
- ▶ Bodénez C, Bernet I, Willer JC et al. Facial nerve decompression for idiopathic Bell's palsy: report of 13 cases and literature review. J Laryngol Otol. 2010 Mar; 124(3): 272-8
- ▶ Gantz BJ, Rubinstein JT, Gidley P, Woodworth GG. Surgical management of Bell's palsy. Laryngoscope. 1999 Aug; 109(8): 1177-88
- ▶ Cannon RB, Gurgel RK, Warren FM, Shelton C. Facial nerve outcomes after middle fossa decompression for Bell's palsy. Otol Neurotol. 2015 Mar; 36(3): 513-8
- ▶ Baugh RF, Basura GJ, Ishii LE, et al. Clinical practice guideline: Bell's palsy. Otolaryngol Head Neck Surg 2013;149:S1Y27.
- ▶ House JW, Brackmann DE. Facial nerve grading system. Otolaryngol Head Neck Surg. 1985;93:146-147.

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