Twenty-four hour circadian rhythm in craniopharyngiomas: pre- and postsurgical instrumental and clinical evaluation.

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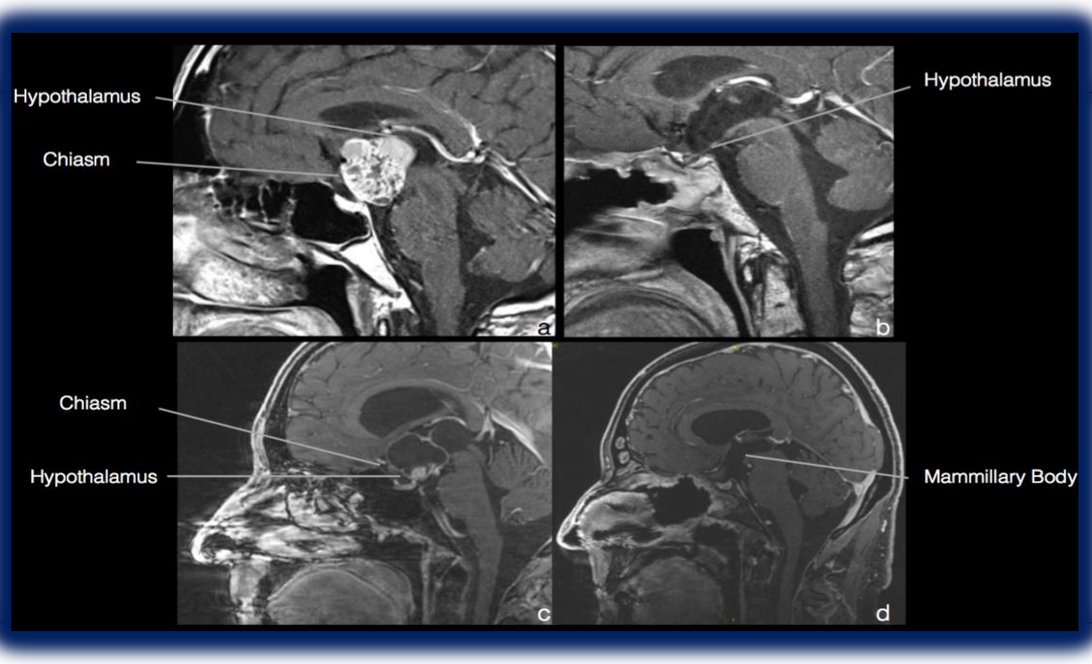
Background

- Craniopharyngiomas (CP) account for 2-4% CNS tumors. They show a bimodal distribution (**5-14** ys, **65-74** ys). Hystologically in adults they are **50%** papillary and **50%** adamantinomatous. They can be divided in intraventricular and tubero-infundibular *(Pascual J. Neurosurgery – 2013)*. The latter can involve the tubero-mammilary complex **(third ventricle floor)** relating to a higher rate of sleep-wake cycle alteration after surgery. Clinical markers of posterior hypothalamic involvement are a higher BMI variation and diabetes insipidous. A chiasm compression *(SCN lesion?)* has been related to a dissociation between sleep onset latency and pre-bedtime distal to proximal skin temperature gradients *(Joustra et al., Eur J Endocrin. – 2014).* Our study aimed to determine the incidence rate of circadian rhythms alterations in CP and to obtain presurgical markers related to a higher risk of hypothalamic functions impairment.



Results (sleep-wake cycle)

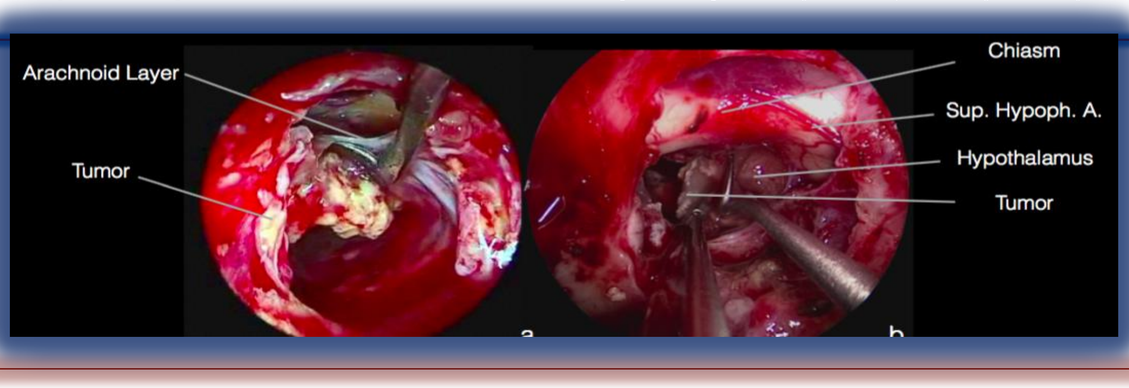
➢ Before surgery:

- **SE** (sleep efficiency) reduced in **8**/ **10** patients (mean value **69,6%**; SD: 22).
- Sleep stages %: **NREMs 1-2:** 57,8% (SD: 4,8), **NREMs 3:** 27,6% (SD: 9,4), **REMs:** 14,6% (SD: 6,9).
- **7** patients had **1-3** diurnal naps with mean length: **35** minutes (SD: 14) more frequent in the *afternoon*.

➢ After surgery:

- SE improved in **4**/ **8** (mean value **79,3%**; SD: 19).
- Sleep stages %: **NREMs 1-2:** 58,1% (SD: 5,3), **NREMs 3:** 22,1% (SD: 7,8), **REMs:** 19,9% (SD: 4,7).
- **8** patients had **2-6** diurnal naps mean length: **53** minutes (SD: 27) during *entire daytime* (07:09 – 22:04).
- *No significant difference in REM latency was observed.*

- The involvement of the **third ventricle floor** was related to a greater daytime drowsiness before and after surgery (without significant differences in SE).



Materials and methods

- We enrolled **10** consecutive patients with CP undergoing **endoscopic endonsal surgery** over a period of **2** years.
- They all underwent a clinical (visual field, endocrinological assessment), laboratoristic and neuroimaging evaluation (sellar and parasellar MRI) before and **3-6-12 mo** after surgery.
- Circadian rhythms evaluation consisted in **BCT° rhythm monitoring** by means of a mini-logger portable device and **24 h sleep-wake cycle recording** (before and **6 mo** after surgery).

Results (BCT° rhythm)

- **BCT° ➡** *pathologic* **(Path.)** if ≧ **1** between **Mesor**, **Amplitude, Acrophase** was impaired respect to control values of our laboratory.

	Histology	*Temp . R.*	*Temp. R.*
1	adamantimatous	Path.	Improved
2	adamantimatous	Norm.	Norm.
3	adamantimatous	Norm.	Path.
4	papillary	Path.	Path.
5	papillary	Path.	Norm.
6	papillary	Path.	Norm.
7	adamantimatous	Path.	Improved
8	papillary	Path.	Improved
9	adamantimatous	Norm.	Norm.
10	adamantimatous	Norm.	Norm.

Conclusions

- Our data confirmed that, besides endocrine dysfunctions and weight variations, CP could disrupt circadian rhythms, and especially the sleep-wake cycle and BcT° rhythm. After surgery some patients showed a normalization of circadian rhythms, whereas in other patients circadian rhythms appeared disrupted only after surgery.