

# Ganglioneuroblastoma in an adult patient: *clinical case, follow up and treatment*

Alessandro Innocenti, Giorgia Simonetti, Paola Gaviani, Laura Fariselli,  
Francesco Di Meo, Elena Lamperti, Andrea Botturi, Antonio Silvani  
I.R.C.C.S Istituto Neurologico Carlo Besta, Milan, Italy

## Ganglioneuroblastoma...

Peripheral neuroblastic tumors are malignant tumors derived from neural crest cells. They are generally classified as neuroblastoma (NB), ganglioneuroblastoma (GNB) and ganglioneuroma; ganglioneuroblastoma is further categorized into 2 groups, intermixed and nodular GNB. Neuroblastic tumors are commonly tumors of childhood; in adults the incidence is low (fewer than 0.12 cases per million, Davis et al., 1987; Sorrentino et al., 2014).

GNB is composed of both small round, immature neuroblast cells and mature ganglion cells. It is usually found in the adrenal gland, mediastinum and retroperitoneum; the involvement of the CNS is less common.

Prognosis for GNB with CNS involvement is negative, with a median survival of 14 months (Schipper et al., 2012). Regarding the treatment, surgery is the first choice; the benefit of adjuvant therapy is unclear (Okudera et al., 2014).

## ...and Olfactory Neuroblastoma

Olfactory neuroblastoma (or esthesioneuroblastoma, ONB) is a malignant neuroectodermal tumor. It is typically site specific, originating from the olfactory ethmoidal epithelium of the upper nasal cavity (Bates et al., 2012; Thompson, 2009). ONB tends to have an aggressive behavior, involving and locally invading adjacent structures, but in some cases it can give distant metastases (Thompson et al., 2009). Ganglioneuroblastic differentiation is rare and usually focal: only 16 cases of ONB with ganglioneuroblastic transformation have been reported, whose only 3 with a complete ganglioneuroblastic transformation (Squillaci et al., 2014; Bates et al., 2012).

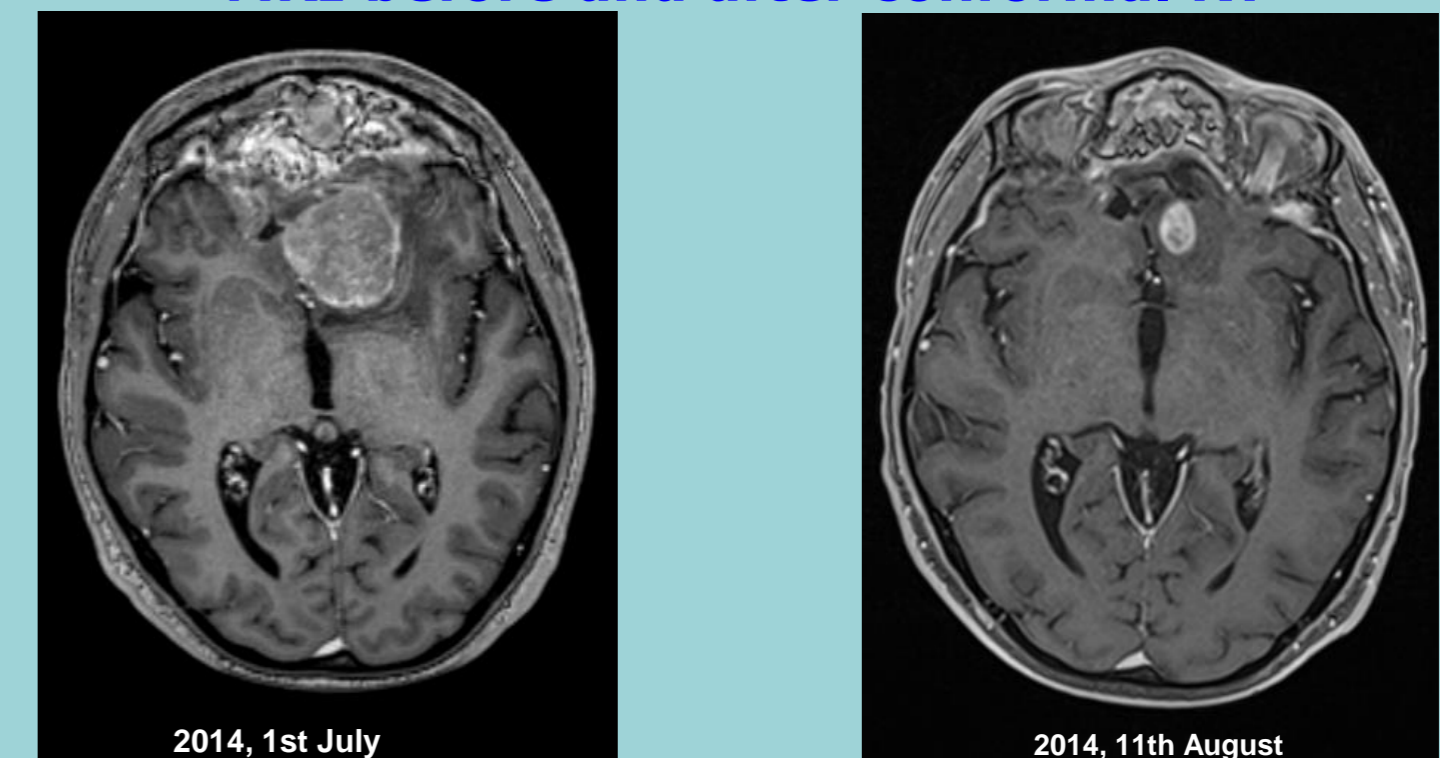
## Case Report

In 2014 a 37-year-old male underwent biopsy for a ganglioneuroblastoma of cribriform plate, extended to frontal lobes. Patient was treated with conformal RT. A MRI performed one month after showed a reduction of the lesion; then, chemotherapy (TMZ, CDDP) was begun for 4 months.

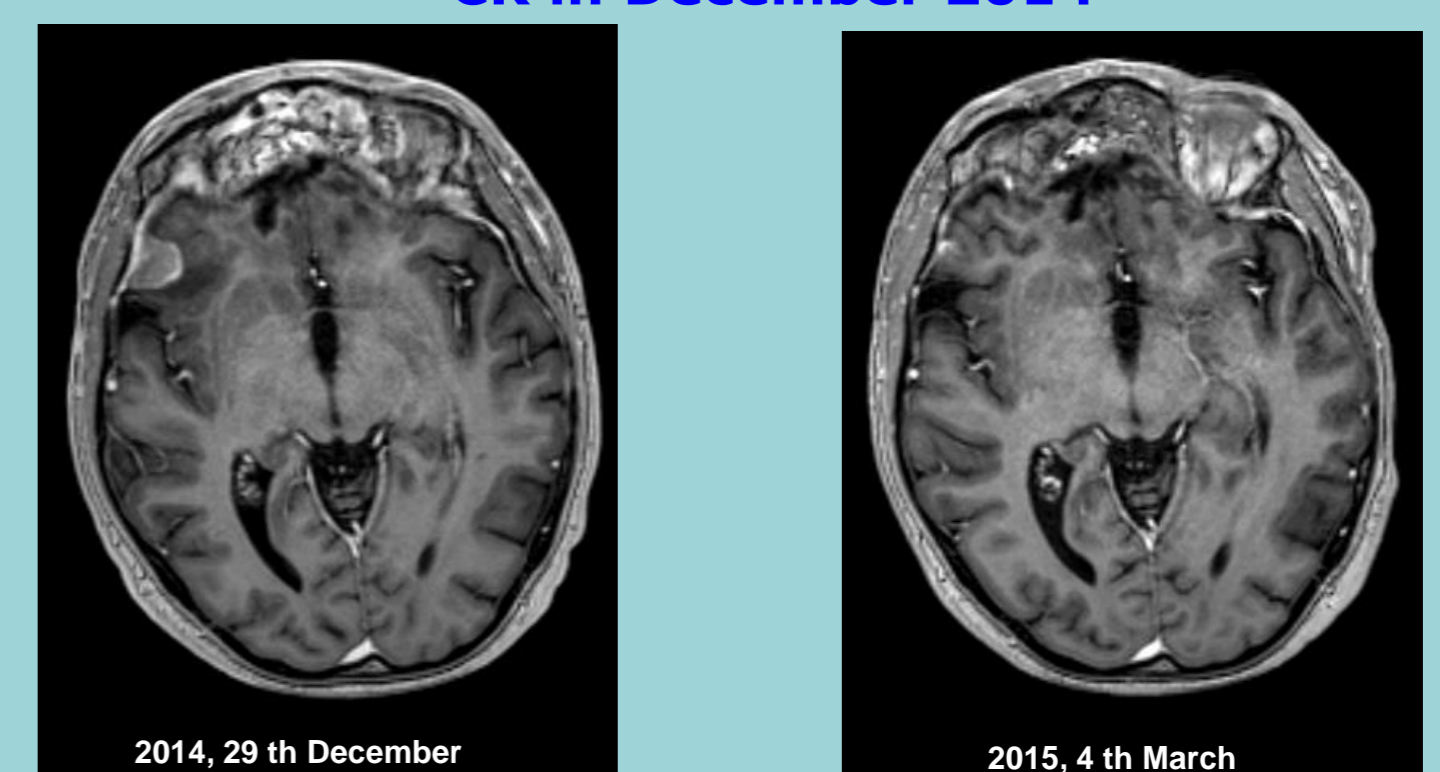
For a disease progression patient underwent CyberKnife (22 Gy), with an excellent local response.

Despite chemotherapy with Vincristine, Procarbazine and Lomustine, a new recurrence was observed with involvement of subcutaneous tissue near the cheekbone. A total body PET also showed metastatic lesions in almost all the bones, in the liver and several lymph nodes. Facial localization was treated with CyberKnife (30 Gy), again with good response. A new chemotherapy with Cyclophosphamide, Doxorubicin and Vincristine, alternating with Etoposide and Cisplatin, was carried out for about 6 months. Despite a good control of the disease in CNS, a progression in bones and liver was shown in August 2015. Alternative treatments with <sup>131</sup>I-Labeled MIBG or ALK inhibitors were being evaluated but the patient developed acute liver failure and died after a sudden worsening.

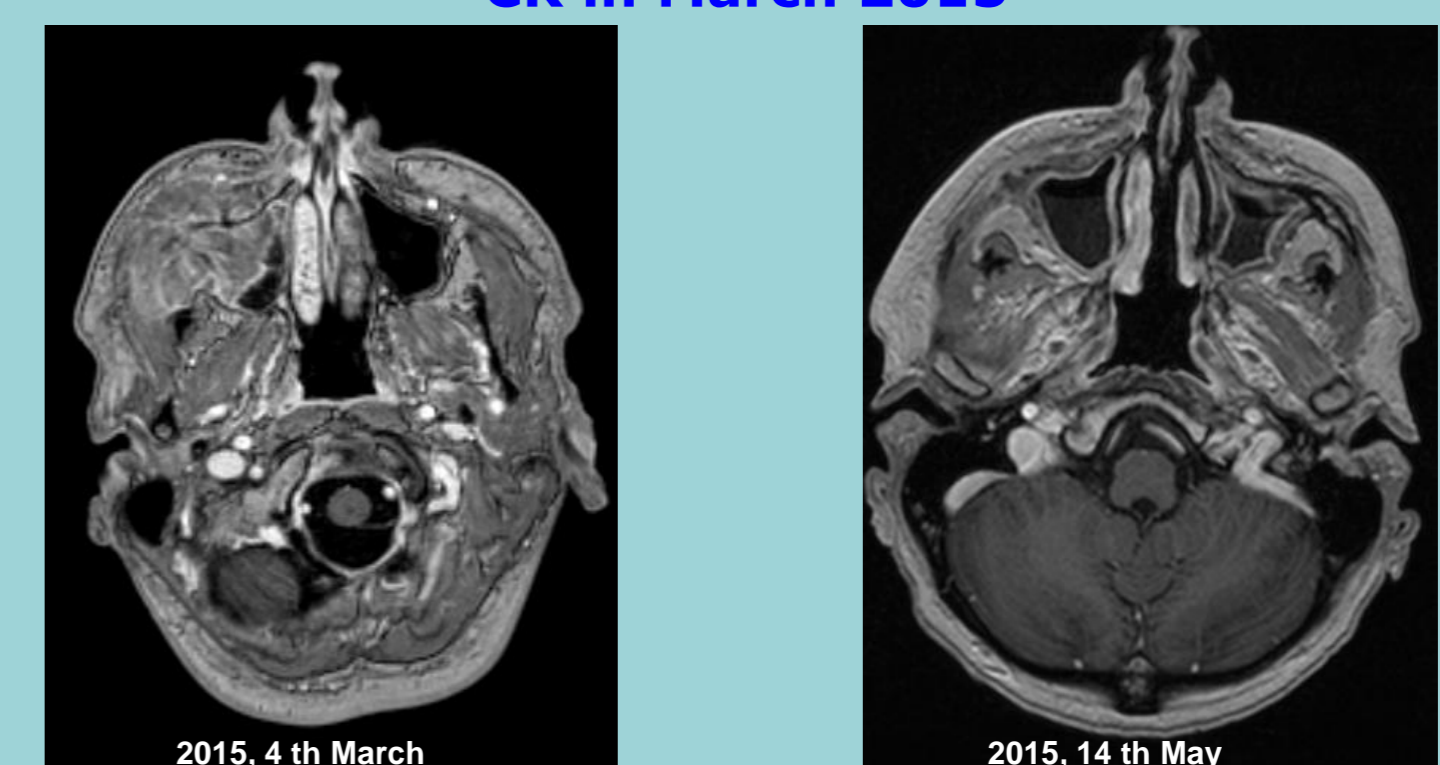
MRI before and after conformal RT



CK in December 2014



CK in March 2015



## Conclusions

ONB with complete GNB transformation is extremely rare, and, in addition to our case, only 3 others were described before. Rare occurrence makes therapeutic trials extremely difficult, and the role of radio and chemotherapy is unclear.

Despite patient outcomes was poor, the good local response to RT and radiosurgery in the CNS opens new therapeutic perspectives for these rare tumors.

In our experience, radiotherapy and radiosurgery should be considered as therapy of choice.

### BIBLIOGRAPHY

- Bates, T., Plessis, D.D., et al., (2012). Ganglioneuroblastic Transformation in Olfactory Neuroblastoma. *Head Neck Pathol.* 6, 150-155.
- Davis, S., Rogers, M.A., et al., (1987). The incidence and epidemiologic characteristics of neuroblastoma in the United States. *Am. J. Epidemiol.* 126, 1063-1074.
- Okudera, Y., Miyakoshi, N., et al., (2014). Ganglioneuroblastoma of filum terminale: Case report. *J. Neurosurg. Spine* 1-5.
- Schipper, M.H., van Duinen, et al., (2012). Cerebral ganglioneuroblastoma of adult onset: Two patients and a review of the literature. *Clin. Neurol. Neurosurg.* 114, 529-534.
- Sorrentino, S., Gigliotti, A.R., et al. (2014). Neuroblastoma in the Adult: The Italian Experience With 21 Patients. *J. Pediatr. Hematol. Oncol.*
- Squillaci, S. (2014). Olfactory neuroblastoma with focal ganglioneuroblastic differentiation: a case report with literature review. *Pathologica* 106, 61-66.
- Thompson, L.D.R. (2009). Olfactory Neuroblastoma. *Head Neck Pathol.* 3, 252-259