

## Rhabdomyosarcoma of the head and neck in children

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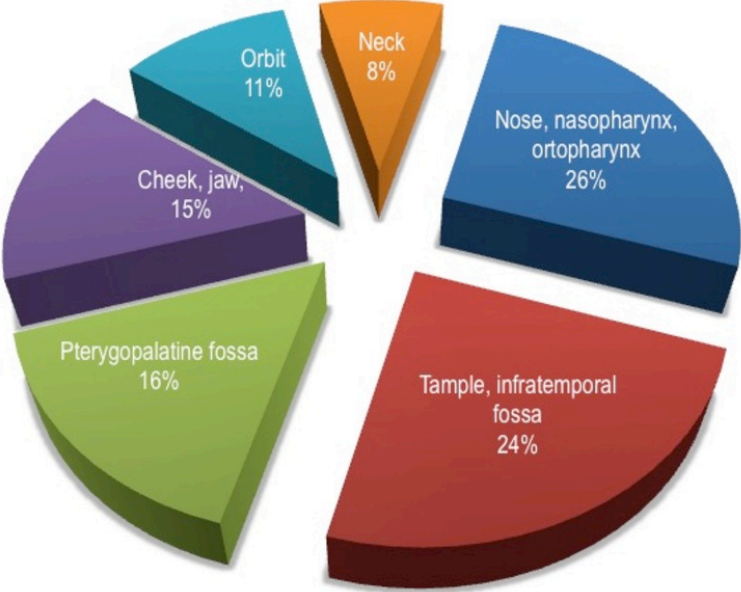
## Aims and objectives

Rhabdomyosarcoma (RMS) is a malignant neoplasm from stem cells, precursors of skeletal muscle, which is one of the most common soft tissue sarcomas in childhood. RMS can exist in any part of the body, but almost 30% of PMS is in the head and neck. The aim of this study was to analyze and describe the main radiological features of rhabdomyosarcomas of the head and neck region in children, and also to compare radiological features between embryonal and alveolar histological rhabdomyosarcomas.

## Methods and materials

Inclusion criteria: patients with visualization before treatment; diagnosis - rhabdomyosarcoma of head and neck region; age - from 0 to 18 years; visualization was made between the May 2012 year and December 2017 year. Head and neck scans were performed on GE Bright Speed CT-tomograph, Philips Achieva 3T and GE Signa Explorer 1,5T tomographs using contrast enhancement. Children younger than 5 years old were scanned under general anaesthesia to prevent motion artefacts.

**Images for this section:**



**Fig. 1:** Localization of RMS of head and neck region

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## Results

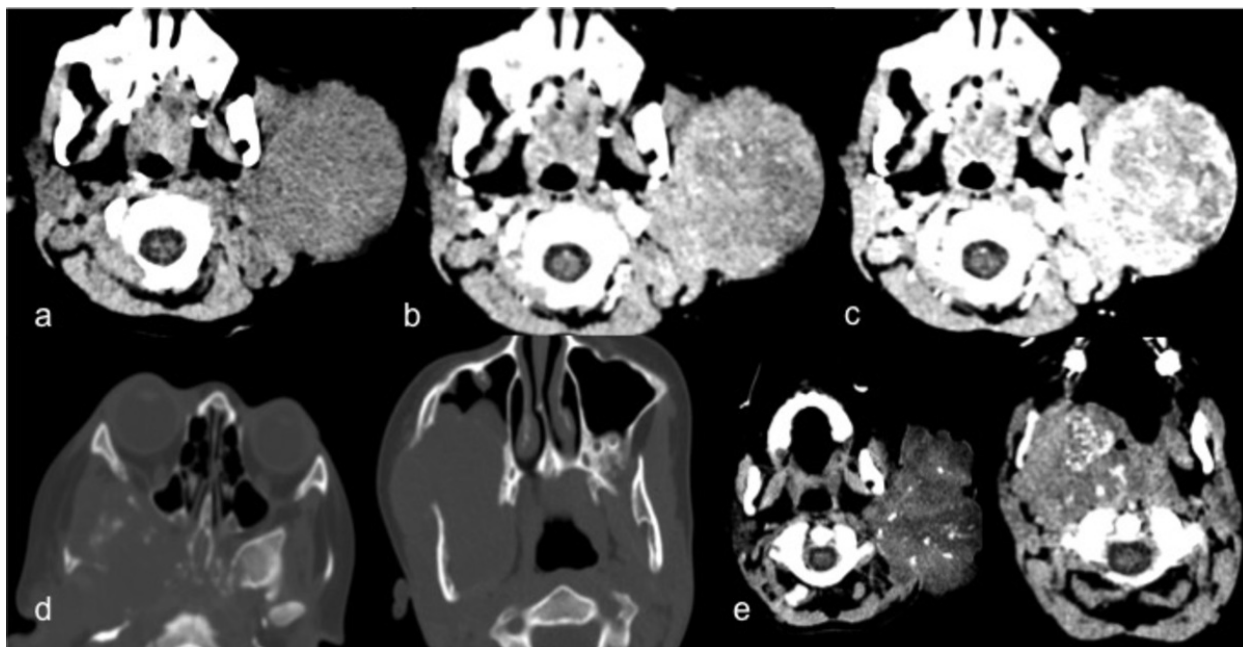
Our research contained 54 patients treated in the Dmitry Rogachev National Research Center of Pediatric Hematology, Oncology and Immunology (Tbl.1). On CT images we evaluated characteristics of the x-ray density of a tumor on different phases of contrast enhancement: native -  $34 \pm 8$  HU, 1CE -  $49 \pm 15$  HU, 2CE -  $60 \pm 22$  HU. Also, the involvement of near bone structures made up 70% and presence of calcinates was in 40% of cases. (Fig. 2) On MRI 83% of tumors were isointensive on T1 WI, 92% of cases was hyperintensive on T2 WI, ACD -  $1505 \cdot 10^{-6} \pm 488 \cdot 10^{-6}$  mm<sup>2</sup>/s and 79% of tumors actively accumulated contrast agent. (Fig. 3) All patients were separate on two groups of histology: embryonal and alveolar RMS. The analysis of ADC did not identify any statistically significant (Student's t-test, Mann-Whitney test) differences between these groups ( $p < 0,05$ )

**Images for this section:**

Mean age	6,3 ± 4,4 year	
Median age	4,5 year (from 1 month to 16 years)	
Sex	Boys	46%
	Girls	54%
Localization	Parameningeal	39%
	Non-parameningeal	61%
Histological group	Embryonal	50%
	Alveolar	45%
	Unknown	5%
Total	54 children	

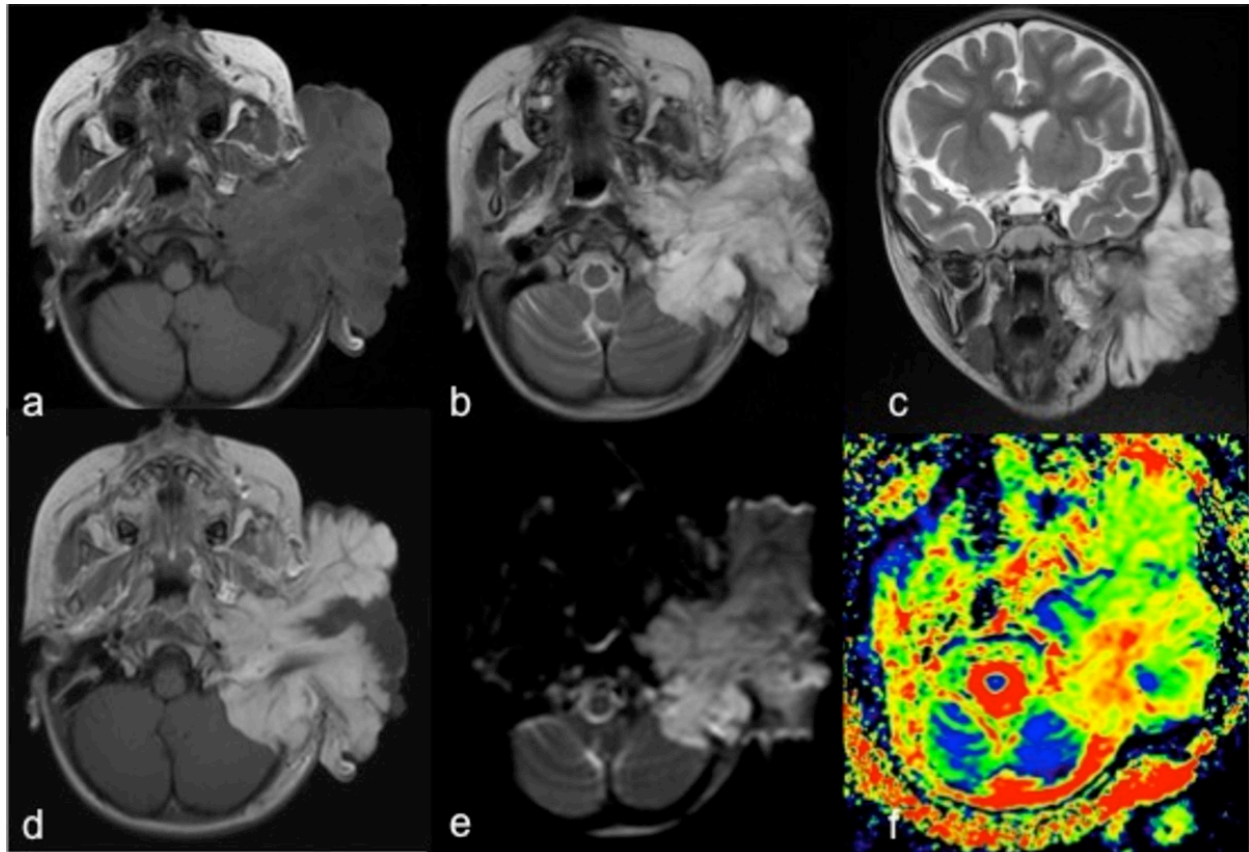
**Table 1:** The distribution of patients included in the study.

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**Fig. 2:** CT axial scans PMS of head and neck region. a. native phase - 40 HU, b. 1CE - 50 HU, c. 2CE - 80 HU, d. examples of bone destruction, e. examples of calcinates in tumor.

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**Fig. 3:** Example of big RMS. a. T1WI ax - isointensive, b. T2WI ax - hyperintensive, c. T2WI cor - hyperintensive, d. T1WI+C - accumulated contrast agent, e. DWI b=1000, f. ADC map -  $1454 \times 10^{-6} \text{ mm}^2/\text{s}$ .

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## Conclusion

This study shows typical radiological features of rhabdomyosarcomas of head and neck region in children. We also show that there are no differences between the histological types of RMS in ADC maps. In future, we want to find the correlation between patient's age, histological type and ADC.



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