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**PREDICTORS OF RADIOIODINE THERAPY EFFECTIVENESS IN CHILDREN AND ADOLESCENTS WITH GRAVES’ DISEASE**

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**Abstract:**

**Aim/Introduction:** Graves’ disease (GD) - common cause of hyperthyroidism in different age groups, including children and adolescents. Treatment with $^{131}$I requires individual dosimetry-based justification of therapeutic activities to improve effective outcome and acceptable safety. **Materials and Methods:** The article describes 56 children and adolescents (f - 50, m - 6) aged from 8 to 17 years (14.2 ± 0.7 years) with GD. Follow-up ranged 6 - 36 months (18.8 ± 2.8). Thyroid volume varied from 7.1 to 94.5ml (34.7 ± 5.3ml), $^{99m}$Tc-pertechnetate uptake met 1.8 to 41.2% range (15.1 ± 3.0%), $^{131}$I maximum uptake was observed between 10 and 60% (42.5 ± 2.7%). The severity of Graves’ orbitopathy (GO) was assessed. ATD medication ranged 3 - 144 months (37.8 ± 8.3), in some cases thyrotoxicosis recurred during ATD reduction. Calculation of $^{131}$I activity was based on $^{131}$I kinetic investigation. Prescribed $^{131}$I activities, specific $^{131}$I activity and absorbed doses rates at maximum $^{131}$I uptake varied from 534 to 1396MBq (889 ± 58MBq), 4.1 to 27.0MBq/ml (14.4 ± 1.4MBq/ml), and 0.44 to 2.9Gy/h (1.6 ± 0.2Gy/h). TSH, fT3, fT4 levels were checked every month after the treatment. After 6 months were assessed; TSH, fT4, fT3, TSH receptor Ab, thyroid ultrasound. **Results:** The first week after radioiodine therapy (RIT) 11 (20%) children complained of moderate pain when swallowing, which lasted 7-10 days. Hypothyroidism, euthyroidism, thyrotoxicosis developed within 6 months after the treatment in 46 (82.1%), 1 (1.8%) and 9 (16.1%) patients, respectively. Four children received the second RIT: hypothyroidism developed in 3 cases, in one case it was euthyroidism. Fourteen (78%) children with GO signs had no worsening, 3 (16.7%) children showed a progression of exophthalmos with a subsequent improvement, only 1 (5.6%) child showed significant deterioration. The thyroid volume decrease ranged from 12.2 to 94.3% (average 70.0 ± 4.7%). Thus, the predictors of hypothyroidism development are the thyroid volume (P <0.001); TRAb (P = 0.009); specific $^{131}$I activity (MBq/g), (P = 0.009); thyrotoxicosis recurrence during ATD reduction (P = 0.017). Age, gender, GO, prescribed activity of $^{131}$I did not significantly affect the treatment.
Conclusion: RIT is an effective and safe method of GD management in children and adolescents. The main predictors of RIT effectiveness in children and adolescents with GD are the thyroid volume, and specific $^{131}$I activity. Further clinical investigation and advancement of individual dosimetry-based methodology are required to improve treatment outcome and safety of RIT. References: No

Author Disclosure Information:

P.O. Rumyantsev: None.

Topic (Complete): Benign

Disclosures (Complete):

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