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Literature abstract

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Dopamine suppresses pituitary function in infants and children

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Objectives: Dopamine, a natural catecholamine with hypophysiotropic properties, is used as a first choice drug for inotropic and vasoactive support in pediatric intensive care. In infants and children, the pituitary gland plays a crucial role as a regulator of growth, metabolism, maturation and, possibly, immune function. We evaluated the effect of dopamine infusions (5 μg/kg/min iv) on the dynamics of prolactin, growth hormone, and thyrotropin secretion and on the thyroid axis in critically ill infants and children.

Design: Prospective, randomized, controlled, open-labeled, clinical study.

Setting: Intensive care unit of a university hospital over a 9-month period.

Patients and Methods: The study population consisted of infants and children recovering from cardiovascular surgery. The group was stratified into two age groups (infants aged 12 to 90 days [n = 18] and children aged 0.3 to 6.7 yrs [n = 15]) and was studied dynamically (blood sampling every 20 mins for 3 hrs) on two consecutive days, after randomization for dopamine withdrawal on the first or the second day. Serum prolactin, growth hormone, insulin-like growth factor-1, thyrotropin, thyroxine (T_4), triiodothyronine (T_3), and reverse triiodothyronine (reverse T_3) concentrations were measured.

Measurements and Main Results: In the newborns, dopamine was found to suppress prolactin, growth hormone, and thyrotropin secretion consistently, rebound releases starting within 20 mins after dopamine withdrawal. One day later, prolactin concentrations were ten times higher, pulsatile growth hormone secretion was augmented, thyrotropin was unchanged, but T_3 was increased by 30% and the T_3/reverse T_3 ratio was inverted.

In the children, dopamine suppressed prolactin and thyrotropin (but not growth hormone) secretion, rebound releases starting within 20 mins after dopamine withdrawal. One day later, prolactin concentrations were at least twice as high, thyrotropin was increased ten-fold, T_4 was augmented by 14%, T_3 by 30% and the T_3/reverse T_3 ratio had doubled. Neither in newborns nor in children did dopamine withdrawal appear to affect the low serum insulin-like growth factor-1 concentrations.

Conclusions: The data indicate that dopamine infusion induces or aggravates partial hypopituitarism and the euthyroid sick syndrome in critically ill infants and children.