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Thyroid hormones modify uterine contractility

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Abstract

To date, no study has evaluated whether uterine contractility is modified by hypothyroidism or T_4 treatment. This study analyzes the physiological role of Levothyroxine (T_4) and Triiodothyronine (T_3) on uterine contractions. Three approaches were used to assess our objectives. *Human model.* Uterine biopsies were obtained from consenting female patients undergoing elective caesarean under T_4 treatment compared to control patients (N=26). *Animal model.* To induce hypothyroidism, Sprague-Dawley rats (N=18) followed an iodine deficient diet in absence or in presence of high doses of T_4 (100 ng/kg/day). Isometric tension measurements were performed *in vitro* on myometrium tissues in isolated organ baths to evaluate the contractile activities using various pharmacological tools. *Epidemiological approach*. With the aim of extending our *in vitro* observations, an institutional database was screened to perform a retrospective analysis of pregnancy outcomes on a cohort of 8638 women. On uterine strips from women treated for hypothyroidism, we observed phasic contractions of larger amplitude (+ 77%), with a prolonged duration at 90% relaxation (+ 138%) and reduced frequency (-55%) as compared to the values from the control group. In the animal model, we demonstrated that hypothyroidism significantly decreases contractile duration, and increase the contractile frequency while high doses of T_4 increases duration and decreases frequency. These results mimic the pattern of abnormal contractions observed in T4-treated pregnant women. Upon epidemiological review, the C-section rate was two-fold higher in this group. Thus, a better management of patients is required during pregnancy to reduce the C-section rate in this group.

Biography

Stephanie Corriveau is a Ph.D student from Université de Sherbrooke (Québec, Canada). Her work focuses on the prevention of preterm labor and more specifically, on the inhibition of myometrial contractile activity. She has already published 5 articles in international journals, among which an original observation in the *Am J. of Physiol. Endocrinology and metabolism*. She is a recipient of PhD bursaries from both FRQS (Fond de Recherche du Québec-Santé) and Rx & D Health Research Foundation. She is the recipient of several awards from the Foundation of Stars, Club de Recherches Cliniques du Québec and the Université de Sherbrooke Faculty of Medicine and Health Sciences.