Rapid effects of estrogen on intracellular Ca2+ regulation in junctional myometrium through the menstrual cycle in patients with adenomyosis

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The dysfunctional contractility of junctional zone (JZ) might be associated with aetiology of adenomyosis. Estrogen may regulate the contractility of JZ across menstrual cycle by altering the intracellular [Ca2+]i. Here, we explored the membrane estrogen receptor-? (ER?) expression using western blotting in JZ smooth muscle cells (JZSMCs) from patients with and without adenomyosis in different menstrual cycle. We report that membrane ER? expression was comparable high showing no cyclical change in adenomyosis. Moreover, we have investigated the rapid effects of estrogen on intracellular [Ca2+]i using laser scanning confocal microscope. Estradiol rapidly induced [Ca2+]i increase in JZSMCs in both groups. The [Ca2+]i flux was statistically different in cycle phases in control, but not in adenomyosis group. And the elevation of [Ca2+]i induced by estrogen in adenomyosis was statistically greater than those in control regardless of cycle phase. When pretreated with ER? antagonist ICI182, 780, the increase of [Ca2+]i were obviously reduced in both groups and showed no statistical difference. Filtered E-6-BSA also induced [Ca2+]i flux, and their actions were similar with estrogen. Removal of extracellular Ca2+ did not alter the effect of estradiol, but phospholipase C inhibitor U73122 (10?M) and 2-aminoethoxydiphenyl borate (5?M), an inhibitor of the inositol-1,4,5,-trisphosphate-gated intracellular Ca2+ channel, significantly decreased the estradiol-induced [Ca2+]i flux. Estradiol was unable to induce [Ca2+]i flux in thapsigargin depleted cells. These results indicate that estradiol mediates [Ca2+]i flux in JZSMCs through ER? that activates the phospholipase C pathway. In conclusion, we found that the rapid effects of estrogen on [Ca2+]i flux in JZSMCs from adenomyosis are different from those in control. The abnormal intracellular [Ca2+]i response to E2 could account for the aberrant junctional zone peristalsis.

Mots clefs : Adenomyosis, junctional zone, estrogen, [Ca2+]i flux
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