Lipocalin-Type Prostaglandin D Synthase expression decreases in Adenomyosis: a breakthrough in diagnosis and treatment?

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Introduction/Background
Adenomyosis is a common benign gynecological condition whose pathophysiology is not yet fully understood. The involvement of the Prostaglandin D2 pathway has been studied in several pathologies, but never in human adenomyosis. Understanding the interaction between Prostaglandin D2 and adenomyosis could improve management strategies for affected women.

Materials and Methods
This was a cohort study on human uterus samples. We analyzed 25 anonymous cases of uterine specimens, 15 with adenomyosis and 10 controls. We quantified the expression of CD45, a marker of inflammation, and of Prostaglandin D synthases, Lipocalin-Type Prostaglandin D Synthase (L-PGDS) and Hematopoietic-Type Prostaglandin D Synthase (H-PGDS) in seven uterine compartments by immunohistochemical analysis. QuPath software was used to annotate and define regions of interest (ROIs) and automatically quantify intensity of biomarker staining.

Results
We found a significant decrease in Lipocalin-Type Prostaglandin D Synthase expression in the uteri of patients with adenomyosis compared with controls ($p=0.015$). This difference was observed in almost all uterine compartments, with the greatest significant difference in the endometrium and external myometrium. No significant difference was found in Lipocalin-Type Prostaglandin D Synthase expression according to the severity of involvement ($p=0.63$). No difference was found in the expression of Hematopoietic-Type Prostaglandin D Synthase in adenomyosis compared with controls ($p=0.28$). Adenomyosis lesions (ectopic glands) were significantly more infiltrated by CD45-positive inflammatory cells than eutopic glands in controls ($p=0.03$).

Conclusion

We found a significant decrease in Lipocalin-Type Prostaglandin D Synthase expression in the uteri of adenomyosis patients. These data confirm the involvement of the prostaglandin D2 pathway in adenomyosis. This study suggests that Lipocalin-Type Prostaglandin D Synthase could be a new biomarker for early diagnosis and a potential therapeutic target.

Key words
Adenomyosis; Lipocalin Type-Prostaglandin D Synthase; Prostaglandin D2