Quantification of reciprocal spatial distribution of the epithelial glands and blood vessels in deep infiltrating endometriosis as compared to eutopic endometrium

G. Brichant, S. Blacher, M. Alvarez, P. Nervo, C. Munaut, J. Foidart, M. Nisolle

Objective: The aim of this study was to compare the blood vessels and glands distribution in eutopic endometrium (EE) and deep infiltrating endometriosis (DIE) to check if there were any differences in their density and their reciprocal spatial distribution.

Material and methods: Samples of DIE obtained during laparoscopic procedures from 14 patients (9 treated and 5 untreated) and samples of normal secretory endometrium from 11 patients during surgery for benign conditions. The whole slide was pictured with an automated digital microscopy system. The glands and the vessels were manually delineated with Photoshop®.

Results: The mean vascular area density (vessels area/total area) and the number of vessels per mm² were significantly higher in the EE than in DIE (p<0.001). The distribution of the vessels displayed a log-normal distribution in the EE whereas the distribution was uneven in DIE. The mean distance between the center of the vessels and the border of the glands was found to be different in EE and DIE lesions (p<0.001) and also between treated and untreated lesions (p< 0.05).

Discussion: Our methodology provides global results based on a complete evaluation of the tissue. In EE, the vessels were closely apposed to the glands while they were more distant in DIE especially in untreated lesions suggesting that endometrial angiogenesis might be tightly controlled by epithelial cytokines. Moreover, up to 20% of vessels were found at more than 1 mm from the gland in untreated lesions suggesting that angiogenesis in endometriosis could be in part under the control of the inflammatory cytokines that are down expressed in treated patients.