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P355. Uterine tissue microcirculation assessment by sidestream darkfiled (SDF) imaging as a complimentary method to ultrasonography: a pilot study.

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Background: Assessment of microcirculation can reveal important metabolic changes in tissues. Sidestream darkfiled (SDF) imaging is a non-invasive microcirculation assessment technique, used in some clinical and research applications. SDF imaging provides high definition visualisation of micro vessels of the smallest diameter. The use of SDF imaging, complimentary to other established imaging methods, can provide useful information about the state of uterine tissue.
Aims and hypothesis: We hypothesized that SDF imaging can be used to successfully monitor microcirculation in a pregnant rat uterus.
Methods: Adult day-20 pregnant Sprague-Dawley rats (n=4) were anaesthetised and their uteruses were surgically exposed. The Microscan® handheld SDF imaging probe was positioned on an exposed uterus and focused on the superficial tissue layer microcirculation. The quality of microcirculation visualization was assessed including illumination and vessel distinction based on individual vessel diameter and blood flow. Sample video segments were analysed using the AVA v3.2 software. Total vessel density (TVD, in mm/mm2), and uterine vessel distributions by diameter and flow rate were calculated. The ability to observe changes in diameter and blood flow of individual vessels during spontaneous uterine contractions was also tested.
Results: Assessment of microcirculation with a Microscan® handheld SDF imaging probe was successful in all 4 pregnant rats, with adequate levels of tissue illumination and vessel distinction. The imaging revealed clearly identifiable perfused microvessels of varying diameters (7-50 ?M) and flow rates (20-2000 ?M/sec). The directions of flow were also identifiable in most vessels. Contraction-induced changes in diameter and flow rate were observed in some uterine microvessels.
Conclusion: Microcirculation can reveal important physiological changes in tissues. In this pilot study we demonstrated the feasibility of SDF imaging assessment of microcirculation in a uterine tissue of pregnant rats. Here, SDF imaging enabled simultaneous quantification of vessel diameter and blood flow velocity distributions, as well as directions of flow of micro vessels. It can also be used to monitor changes in micro vessel activity during uterine contractions. This novel, non-invasive and contrast-free technique can be used in conjunction with other existing modalities like ultrasonography and provide a different angle of uterine tissue assessment.

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