

INFLUENCE OF EXTENSIVE PERIURETHRAL PREPARATION ON URETHRAL PERFUSION USING COLOUR DOPPLER FLOW QUANTIFICATION

Hypothesis / aims of study

The vascular bed is a one of factors, which contributes to the pressure on the urethra. It is difficult to assess perfusion of the urethra, and there is no good tool to objectively describe the Colour Doppler data. All current studies count the number of vessels or semi quantify the perfusion.

Difficulties currently exist with using Colour Doppler for quantification, because points within the entire US beam differ in the angle which influences the resulting speed. We would like to assess the influence of extensive periurethral preparation on urethral perfusion, as it is performed in vaginal anterior repair.

Study design, materials and methods:

In our prospective longitudinal study we included group of 15 women. There were assessed before the anterior repair and reassessed at follow-up in one year. The mean age was 64,5 years; the mean Body mass index was 29,93, ranged from 26,33 to 32,47 kg/m². US examination was done by Acuson 128XP10, transvaginal transducer with variable frequency. The urethra was in sagittal orientation, and the entire length of the urethra was visualized, from the bladder neck, below the inferior margin of the symphysis pubis. The US scanner set up was identical for all patients and examinations. The examination was recorded and stored in the PC. We chose a sequence of 2 sec / 50 pictures/ because it included at least one heart cycle for analysis. We have used Pixel-Flux software, created for analysis of Colour Doppler studies. The software is able to analyse and compare pixels in a region of interest, with and without colour. It is also able to relate the intensity of colour to a scale, which is on the left side of every picture. Three parameters are calculated: flow velocity **v**, area **A**, and Specific flow **V**. The unit of the velocity is cm/s. The velocity corresponds to the colour values in the video combined with the maximum velocity, which is calibrated to the colour scale. Area A (cm) is calculated from the amount of coloured or perfused pixels in the video images. The definition of the specific flow V is the following equation: $V = v * A / A^{roi}$, where A^{roi} is the area of the outlined region of interest. It indicates the average velocity, if the whole region of interest would be perfused. The flow V increases the objectivity and comparability of perfusion data. The region of interest was the same for all examinations, 2,5 cm², which was always smaller than the area of the urethra.

Results

In 66% of women the V – specific flow increased, in 34% of women the flow decreased. The mean age of women with increasing perfusion was 61 years; the mean gain in perfusion was 0,018 (0,025 – 0,008) ml/cm²;s

The mean age of women with decrease in perfusion was 71 years; the mean loss in perfusion was 0,012 (0,001 – 0,024) ml/cm²;s

Interpretation of results

The perfusion has increased in women with lower age in comparison to group of women where we observed decrease in perfusion. It is surprising that there can be increase in perfusion after such a extended preparation, which can be explained by the induction of angiogenesis during the healing process. It seems to be influenced by age. Due to the design of the study, we cannot draw any conclusions about hormone status. However, we can suspect that there is some hormonal influence based on the results of other studies.¹

Concluding message

During urogynaecological procedures we do not only affect the macro anatomy, but also we cause changes in microanatomy and microcirculation. To be able to answer the question of whether those changes influence the outcomes, we need precise, descriptive tools for observation and a properly designed study. The organism's ability for regeneration decreases

with increasing age, which is apparent in our results. We should keep this fact in mind when we tailor the therapy to older women.

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References

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