

## USING CONTRAST INVERSION TO EXTEND THE DIAGNOSTIC VALUE OF PERINEAL ULTRASOUND IN WOMEN SUFFERING FROM URINARY INCONTINENCE

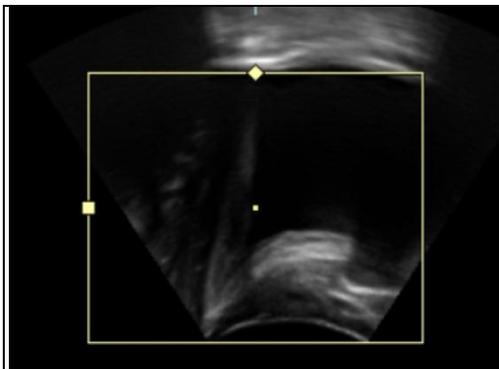
### Hypothesis / aims of study

The aim of our study was to show how using contrast inversion extends the diagnostic value of perineal ultrasound in women suffering from urinary incontinence, in particular with regard to paraurethral abnormalities.

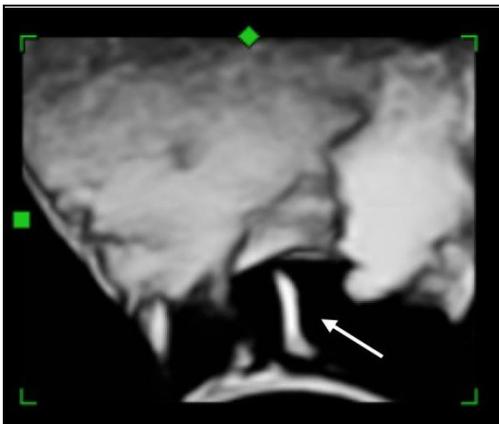
### Study design, materials and methods

To assess the practical value of contrast inversion in daily routine, 19 women with urinary incontinence underwent perineal ultrasound examination. Pictures were converted to contrast inversion and then checked for the visibility of sonographic reference points for urogynecological measurements (urethra, meatus urethrae internus, vesical base) by two independent evaluators both in B-mode and contrast inversion. Visibility in B-mode and contrast inversion was compared using  $p_o$  (coefficient of agreement) and results were then tested for significance using a two-tailed t-test.

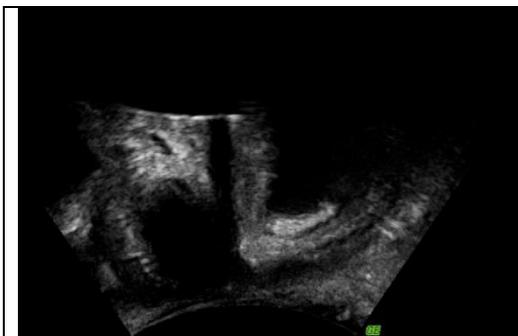
In addition, in our clinical routine we detected several paraurethral abnormalities (paraurethral abscess, glandula paraurethralis, urethral diverticulum) as well as some interesting postoperative findings, which are being contrasted in B-Mode and contrast inversion (see figures below).



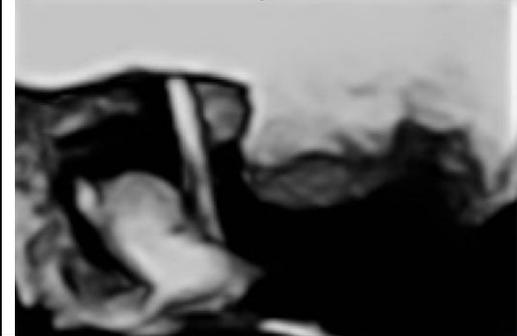
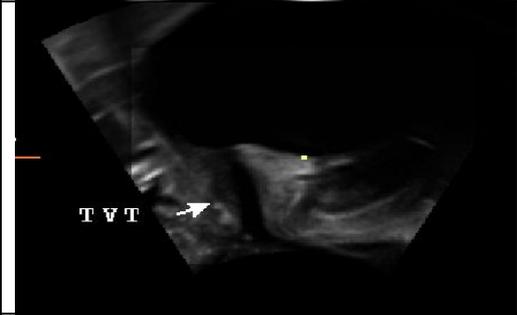
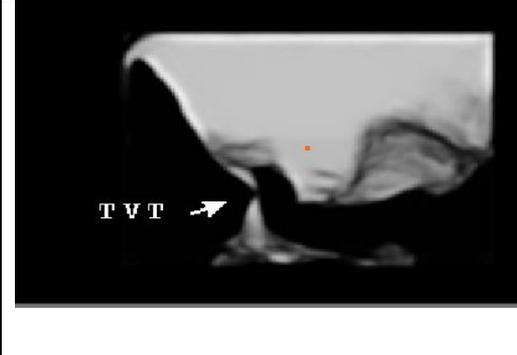
**Figure 1a: Measurement of the retrovesical angle is unsuccessful in B-mode since the urethra cannot be visualized.**



**Figure 1b: After conversion of figure 1a to contrast inversion the urethra can be visualized and the measurement is successful.**



**Figure 2a: A Skene's gland in B-mode. A distinction of the gland from the urethra is impossible suggesting a urethral diverticulum to the examiner.**

	<p><b>Figure 2b:</b> Figure 2a converted to contrast inversion. The gland clearly distincts from the urethra so that the possibility of a diverticulum can be ruled out.</p>
	<p><b>Figure 3a:</b> B-mode picture of a patient (age 55) suffering from voiding dysfunction after the insertion of a tension-free vaginal tape (TVT). Insertion of the tape in the middle of the urethra without any signs of overcorrection can be seen.</p>
	<p><b>Figure 3b:</b> Figure 3a converted to contrast inversion. A urethral kinking in the middle of the urethra resulting from overcorrection can be visualized.</p>

### Results

There was no significant difference between contrast inversion and B-mode with regard to the reproducibility of visibility of the three sonographic reference points. Contrast inversion was superior in depicting paraurethral abnormalities and postoperative findings.

### Interpretation of results

Concerning sonographic routine evaluation the two modes do not reveal any significant difference and can be replaced by each other. For the ultrasound evaluation of paraurethral abnormalities, contrast inversion provides better contour sharpness than the B-mode, suggesting a higher diagnostic value for ambiguous anatomical settings. The nature of contrast inversion nevertheless facilitates misinterpretations and therefore requires frequent comparison with B-mode pictures.

### Concluding message

In conclusion, we propose contrast inversion as a refinement to conventional ultrasound in women with urinary incontinence as it is comparable to the B-mode regarding clinical routine and can be helpful in difficult cases such as paraurethral abnormalities.

<b>Specify source of funding or grant</b>	NONE
<b>Is this a clinical trial?</b>	Yes
<b>Is this study registered in a public clinical trials registry?</b>	No
<b>Is this a Randomised Controlled Trial (RCT)?</b>	No
<b>What were the subjects in the study?</b>	HUMAN
<b>Was this study approved by an ethics committee?</b>	Yes
<b>Specify Name of Ethics Committee</b>	Ethics Committee of the RWTH Aachen University Pauwelstraße 30 52074 Aachen
<b>Was the Declaration of Helsinki followed?</b>	Yes
<b>Was informed consent obtained from the patients?</b>	Yes