covered with a glove and placed on the perineum in a sagittal direction. The patient was asked to cough and strain. On obtaining maximum descent, images were taken and the position of the bladder neck, lowest part of a cystocele, the cervix, cul de sac and rectum determined relative to the infero-posterior margin of the symphysis pubis. Numerical findings for descent of the anterior and posterior vaginal wall as well as for the cervix were compared. The findings were also correlated with a traditional graded organ prolapse assessment (grades I- III).

Results

1.) Clinical staging and ICS system

Table 1 summarizes a comparison between traditional clinical staging and both ICS system and ultrasound assessment of uterine, anterior and posterior vaginal wall descent. Figures are means (SD). For uterine or vault descent ultrasound coordinates were reliably obtained only in 10 patients with no descent, 13 patients with stage I and all 7 patients with stage 2 or 3 descent. 31 patients had had a hysterectomy.

Cystocele	**0 (n=31)**	**I (n=28)**	**II (n=9)**	**III (n=8)**
ICS point Ba	-2.61 (.71)	-1.35 (.78)	1.11 (1.53)	2.25 (1.16)
US coordinates	-1.36 (1.06)	-0.1 (1.2)	1.67 (.92)	3.61 (1.11)
Uterine descent	**0 (n=52)**	**I (n=17)**	**II (n=3)**	**III (n=4)**
ICS point C	-5.1 (1.6)	-3.1 (1)	0 (1.73)	2.5 (1.73)
US coordinates	-2.55 (1.04)	-.3 (1.21)	.2 (1.56)	2.4 (.55)
Rectoenterocele	**0 (n=41)**	**I (n=30)**	**II (n=4)**	**III (n=1)**
ICS point Bp	-2.41 (.54)	-1 (.98)	.25 (.5)	4
US coordinates	-.2 (1.6)	1.25 (1.24)	2.28 (.59)	2.3

2.) ICS system and ultrasound quantification of prolapse

Table 2 shows a comparison of ultrasound and ICS system estimates of organ descent.

	Means (SD)	**correlation coefficient r**
ICS point Ba/ US coordinate C (n=76)	-1.19 (1.88) / -0.02 (1.92)	0.77
ICS point C/ US coordinate U (n=30)	-2.9 (2.95) / -0.64 (1.95)	0.86
ICS point Bp/ US coordinate R (n=76)	-1.63 (1.28) / 0.53 (1.64)	0.45

Conclusion

This study demonstrates that translabial ultrasound can be used to quantify uterovaginal prolapse. Ultrasound measurements tend to be higher numerically due to the different point of reference but correlation with the ICS system and clinical staging is good. Discrepancies may be due to the use of a Sims speculum on clinical examination, the varying strength of Valsalva manoeuvres and the fact that the hymen is a less reliable point of reference than the symphysis pubis. Disadvantages of the ultrasound method include incomplete imaging of cervix and vault with large rectoceles and the possible underestimation of severe prolapse due to transducer pressure. Advantages are the fixed point of reference and the ability to distinguish rectocele from enterocele. Both new methods may allow more accurate followup in the future of repair procedures for incontinence and prolapse.

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THE SUB-OPTIMAL ACCURACY OF THE BLADDERSCAN: RELIABILITY AGAINST A KNOWN VOLUME, USING A MEASURE OF AGREEMENT.

Introduction

The Bladderscan™ BVI 2500 is widely used as an alternative to catheterisation for measuring bladder residual

volume. Accuracy of the machine has been previously established as 41ml (95%CI 26-55) mean difference [true volume -scan volume] with a strong correlation coefficient except at high volumes[1]. Other studies in the literature about Bladderscan have also employed correlation coefficients as a measure of accuracy. The correlation coefficient [r] measures the strength of the *relationship* between two variables, not the agreement between them. Bland & Altman have described a method to test for agreement and repeatability[2]. We have therefore tested the accuracy of the Bladderscan™ BVI 2500 (using a test for agreement) using known bladder volumes obtained from the measuring jug beneath the uroflowmetry apparatus as the absolute comparator.

Patients and Methods

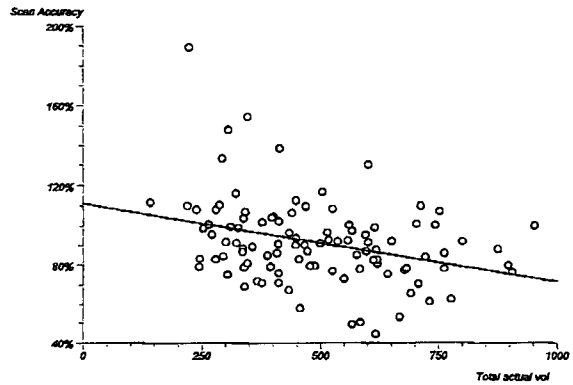
102 women attending a Urogynaecology unit had their bladder volume estimated using a Bladderscan™ BVI 2500. The equipment was recalibrated by the manufactures and the authors had refresher training prior to commencing the study. Women who were known to have voiding difficulty or to have large residuals (>200ml) on urodynamics were excluded. Immediately following Bladderscan volume estimate, the women voided and the collected volume was measured from uroflow jug. Absence of residual volume was rechecked: women with any detectable residual were excluded. Analysis of the Bladderscan volume and actual bladder volume was carried out: the difference between scan volume and actual volume is plotted against the mean of the scan and actual bladder volume. The calculated mean and standard deviation of the difference between scan and actual volume gives the limit of agreement.

Results

The mean scan bladder volume was 437mls (95% CI 415-468). The mean actual bladder volume was 489mls (95% CI 454 - 523). The mean difference was 51mls with limits of agreement from +52mls to -154mls i.e. the bladder scanner could over estimate by 52mls or underestimate by 154mls.

The Bladderscan™ BVI 2500 gives poor agreement with actual bladder volume (see figure 1). As the actual bladder volume increased, the Bladderscan™ tended to under estimate the volume. As the actual bladder volume became smaller the Bladderscan tended to overestimate.

Figure 1; Accuracy of the Bladderscan™ BVI 2500 by actual bladder volume



Conclusions

The accuracy of the Bladderscan™ BVI 2500, when assessed by percentage agreement with a known volume rather than a simple correlation coefficient, appears sub-optimal. It overestimates when the bladder volumes are small.

If the Bladderscan™ BVI 2500 is being used as the sole clinical method of measuring residuals, then it may overestimate and wrongly influence the decision as to whether intermittent self catheterisation is thought necessary. In future, manufacturers should measure the accuracy of such machines by using tests for agreement, not tests for relationship.

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