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URETHRAL KINKING: POSSIBLE ASSOCIATIONS AND RISK FACTORS

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INTRODUCTION

Urethral kinking, or mechanical obstruction secondary to urethral compression, which is associated with anterior compartment prolapse [1], has been suggested as an important risk factor for lower urinary tract symptoms [2].

Although some studies suggest the urethra may become kinked in cystocele with intact retrovesical angle, the etiopathogenic mechanism is still unknown.

Ultrasound imaging has been demonstrated to be a useful tool to diagnose urethral kinking.

AIMS OF STUDY

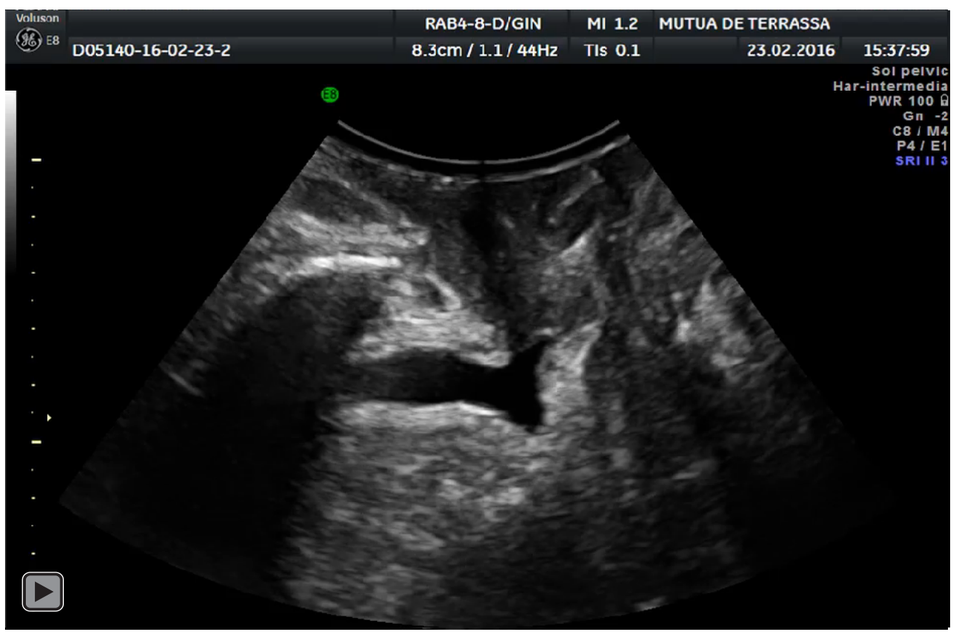
Evaluate the risk factors associated with urethral kinking, including epidemiological, ultrasound and clinical factors.

METHODS AND MATERIALS

This is a retrospective study of 93 patients who were visited in a tertiary pelvic floor unit for a symptomatic anterior compartment prolapse (POP-Q STAGE ≥ II) from January 2018 to January 2019.

All patients were assessed using anamnesis, validated ICS/IUGA questionnaires (ICIQ-SF), physical examination and transperineal 4D- ultrasound (TP-US).

We established 2 groups of study depending on urethral Kinking finding in ultrasound examination, diagnosed as cystocele with intact retrovesical angle which results in a urethral compression against pubis as shown in **video 1** and **figure 1.**



VIDEO 1: Cystocele with urethral Kinking, intact retrovesical angle.

Epidemiological, clinical and ultrasound data variables were collected and compared in both groups.

Postvoid residual volumes were calculated according Dietz's formula [3].

We performed a univariate analysis using a T-student test if the independent variable was quantitative and a Chi-square test if the independent variable was categorical.

We incorporated statistically significant variables in our univariate analysis in a multivariate analysis by logistic regression.

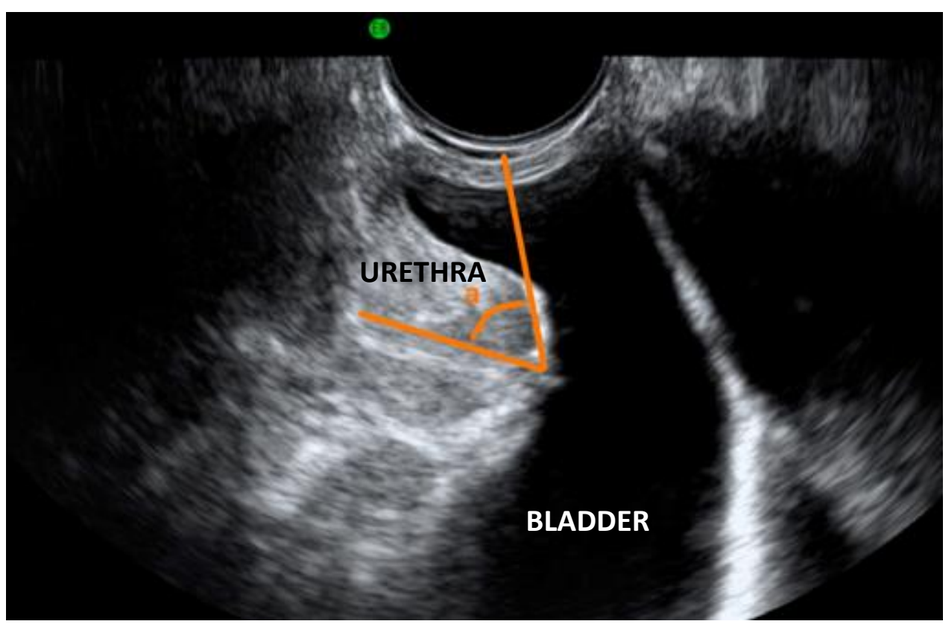


FIGURE 1. Intact retrovesical angle.

RESULTS

93 women were finally assessed, 52 patients (55,91%) had urethral kinking and 41 patients (44,09%) didn't.

Epidemiological, clinical and ultrasound data of both groups are presented in **Table 1.**

TABLE 1: Epidemiological, clinical and ultrasound data

Variables	No Kinking group: (n= 41)	Kinking group: (n= 52)	Univariate p	Multivariate P
Age (years)	60,05 +/- 11,53	64,98 +/- 11,76	0,00457*	0,548***
BMI (kg/m^2)	25,73 +/- 4,97	28,18 +/-4,64	0,0195*	0,093***
Parity (n)	2,53 +/- 1,29	2,61 +/- 1,25	0,7669*	-
Previous history of instrumental delivery	27,50 %	19,61%	0,381**	-
Maternal age at first delivery (years)	26,29 +/- 5,13	24,61 +/- 4,56	0,0991*	-
Birth weight of the heaviest baby (g)	3436,85 +/- 615,54	3693,02 +/- 503,86	0,0298*	0,206***
TP-US Urethra mobility (mm)	22,56 +/- 8,65	25,01 +/- 10,45	0,2299*	-
Levator ani avulsion	48,72%	26,92%	0,032**	0,09***
Ballooning (cm^2)	31,5 +/- 8,52	31,98 +/- 7,85	0,7799*	-
POP-Q St II	56,10%	36,56%	0,06**	-
POP-Q St III	39,02%	40,08%	0,894**	-
POP-Q ST IV	4,88%	23,08%	0,015**	0,0037***
US Postvoid volume	29,40 +/- 67,1	53,72 +/- 46,8	0,0426*	0,049***
Postvoid volume ≥50cc	9,76%	46,15%	0,0001*	0,001***
Stress incontinence	36,59%	40,38%	0,709**	-
Overactive bladder	51,22%	53,85%	0,801**	-
Voiding disfunction symptoms	48,78%	42,32%	0,533**	-

**T-Student, **Chi-square test, ***Logistic regression*

In the univariate study, age, BMI, birth weight of the heaviest baby, levator ani avulsion, stage IV of POP-Q, total postvoid volume and postvoid residual volumes larger than 50cc were statistically significative when comparing both groups. However, after incorporating all these variables in a multivariate analysis, only total postvoid volume, postvoid volumes larger than 50cc and stage IV of POP-Q remained significative (p=0,0429 and p = 0,015).

Reported odds ratio of significant variables in multivariate analysis are presented in **Table 2.**

TABLE 2: Details of variables statistically significative in multivariate analysis

	No Kinking (n= 41)	Kinking (n= 52)	*P*	*Coef*	*OR*	*OR CI 95%*
US Postvoid volume (cc)	29,40 +/- 67,07	53,72 +/- 46,82	0,049	0,012	1,013	(1,011-1,024)
Postvoid volume ≥50cc	9,76%	46,15%	0,001	2,07	7,93	(2,47-25,46)
POP-Q stage IV	4,88%	23,08%	0,0037	1,03	5,85	(1,23-27,86)

•Multivariate logistic regression

DISCUSSION

In our study, urethral kinking was associated with postvoid residual volume assessed by US, especially larger volumes. We also found an association between kinking and advanced anterior POP (stage IV).

We didn't find epidemiological data or clinical data related to urethral kinking, including clinical postvoid dysfunction.

The analysis of the ultrasound data did not show any levator injury, neither avulsion nor ballooning, associated with urethral kinking.

Further investigation involving prospective studies is needed in order to confirm these findings.

CONCLUSION

Urethral kinking is associated with voiding dysfunction and advanced anterior POP.

References

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