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Research Article

Predictors of successful fitting of vaginal pessary for female pelvic organ prolapse

Abstract

Introduction and Hypothesis: There is variable evidence on predictors of successful fitting of vaginal pessary for female pelvic organ prolapse (POP). This study evaluates measures that may predict successful pessary fitting for POP.

We hypothesized that previous hysterectomy and higher body mass index (BMI) do not affect the ability to retain a pessary and that POPQ measures cannot predict a successful pessary fitting.

Methods: This is a retrospective observational study of women with POP referred to the urogynaecology clinic between October 2012 and Oct 2015, who agreed to have pessary insertion. The option of vaginal pessary is routinely offered to these women. Patient demographics, pelvic organ prolapse quantification (POPQ), size and type of pessary use and its outcome were recorded.

Results: Of the 259 women who opted to use a pessary, 201(78%) successfully retained the pessary at 4 weeks after insertion. Various pessary types were used. Predictors of successful pessary fitting were larger total vaginal length, shorter genital hiatus, shorter genital hiatus/total vaginal length ratio, larger perineal body length and early stage anterior vaginal wall prolapse predicted successful pessary fitting. Hysterectomy status did not predict fitting ($p>0.05$). Most of the patient variables did not predict the success or failure of pessary fitting except for the BMI. Women with a higher BMI increased the odds of a successful pessary fitting (OR 1.09).

Conclusion: Most women with POP can be successfully fitted with a vaginal pessary. POPQ measures can be helpful in determining successful pessary fitting

Brief Summary: Successful vaginal pessary fitting can be achieved for most women with POP. POPQ measures can help in determining successful fitting of a vaginal pessary.

Introduction

Pelvic organ prolapse (POP) is not uncommon in parous women [1,2]. Treatment options for prolapse include surgical [3-5] and non-surgical techniques such as pelvic floor exercises [1,2,6-8] and vaginal pessaries [1,8]. Pessaries have been in use for management of POP for many years [4]. Traditionally pessaries have been offered to women who were not keen to have surgery, wish to bear children in future, as a temporary measure to control POP symptoms while awaiting surgery or as an alternative to surgery for women who were medically unfit [9,10]. However, it has been shown that pessaries are a viable option for any woman who wishes to use it as a treatment option for POP [11-13]. A study by Kapoor et al. [13], has shown that when pessaries were offered as a treatment option to patients with symptomatic POP, nearly two thirds of women opt for pessary over surgery as initial treatment.

Success of pessary insertion is best predicted by clinician's experience. However, some health care providers may consider

it a process of trial and error. There is dearth of information on factors that may predict successful pessary fitting including patient specific characteristics. Moreover, validated pelvic organ prolapse quantification (POPQ) [14] measures in assessing success of pessary fitting for POP has not been evaluated.

There is limited evidence on predictors of successful fitting of vaginal pessary for female POP. The aim of this study was to determine whether successful pessary fitting can be predicted by specific factors and POP-Q measurements.

We hypothesized that previous hysterectomy and a higher body mass index (BMI) does not affect the ability to retain a pessary and that no POPQ measures can predict a successful pessary fitting.

Materials and Methods

All women referred to a specialist urogynaecology clinic at the Royal Cornwall Hospital with bothersome POP between

October 2012 and October 2015, were offered a choice of vaginal pessary or operation. These women had received pelvic floor muscle training. Women who agreed to pessary treatment were included. Those who opted for operative treatment were excluded. This observational study was reviewed by the local Research and Development department at The Royal Cornwall Hospital and decision was given that it did not need Ethical/Institutional Review Board Approval.

A detailed history was taken and demographic data was collected as shown in table 1. All patients were examined by a consultant Urogynaecologist and the degree of POP was determined using the International Continence Society (ICS) POPQ [14].

We used a wide range of pessary types and sizes i.e ring pessary with and without support, gellhorn (short and long stem), cube and shelf pessary (Figure 1). The choice of pessary was dependent on previous pessary use in primary care and its outcome and the keenness of the woman to retain her vaginal sexual potential. Type of pessary and the size of pessary inserted were recorded at all visits.

The ring pessary was the pessary of choice, and in some patients different sizes of pessaries were tried before comfortable fitting was obtained. If the ring pessary was unsuccessful and the patient was sexually active, a cube pessary was offered. If the ring pessary was unsuccessful and the patient was not sexually active, a gellhorn or a shelf pessary was inserted. The pessary was regarded to be successfully fitted if it was a comfortable insertion, resulted in reduction in prolapse symptoms and the woman wanted to continue to use the vaginal pessary, did not expel it on straining, standing and coughing and managed to retain the pessary without discomfort at 4 weeks after insertion [15,16]. Women were seen at 6 months to establish on-going use of pessary. Various patient variables were recorded and compared for successful and unsuccessful pessary fitting.

Patients were regarded as lost to follow-up if they successfully retained the pessary at 4 weeks but did not attend for 6 month appointment.

Statistical methods

Discrete variables were described using count (%) and continuous variables using mean (SD). Comparisons of characteristics between subjects with successful and unsuccessful pessary fitting were tested using Independent *t* test for continuous



Figure 1

outcomes and Pearson's Chi Squared or Fishers Exact as appropriate for discrete outcomes. Binary logistic regression was used to explore if POPQ measures were predictive on successful pessary fitting. Statistical significance was accepted if $p < 0.05$. All analyses were conducted using IBM SPSS v24 (Armonk, NY, USA) [17].

Results

Over the three year study period, 604 women were referred to the specialist urogynaecology clinic at The Royal Cornwall Hospital with POP symptoms. 259/604 (43%) women with symptomatic POP opted for pessary use. The descriptive characteristics of the study population are found in table 1.

Seven women/259 (2.7%) were lost to follow-up. Of the remaining women, 201/259 (80%) successfully retained the pessary at 4 weeks after insertion and 51 women (20%) were unsuccessful fittings.

Of the 51 women, 36 (71%) opted for surgery, the others decided to have no further intervention. The descriptive analysis of demographic details of women who agreed to use pessary are shown in table 1. Mean POPQ was stage 2 in women who opted for pessary use (Table 1).

Fifteen per cent and 19% of women had a single compartment prolapse, 46% and 44% a double compartment prolapse and 39% and 37% a triple compartment POP in successful and unsuccessful pessary use group respectively.

Table 1: Descriptive statistics for the women who agreed to pessary insertion (n=259).

Subject characteristics	N (%) or Mean (SD), range
Demographics	
Age	65.9 (16), 24 to 113
BMI (kg/m ²)	29.5 (6), 19 to 52
BMI normal (<25 kg/m ²)	37 (14.5%)
BMI overweight (25-29.9 kg/m ²)	126 (50.1%)
BMI obese (≥30 kg/m ²)	91 (35.8%)
Parous	253 (99.6%)
Prior Hysterectomy	66 (26%)
Previous Repairs	51 (20%)
POPQ Parameters	
Aa (cm)	-0.86 (1.4), -3 to 3
Ba (cm)	-0.07 (1.5), -3 to 3
Ap (cm)	-1.6 (1.4), -3 to 2
Bp (cm)	-1.0 (1.6), -3 to 3
C (cm)	-2.6 (3.0), -8 to 6
GH (cm)	4.4 (1.0), 1 to 7
PB (cm)	2.0 (0.5), 0.5 to 4
TVL (cm)	8.7 (1.2), 5 to 12
D (cm)	-5.0 (1.1), -8 to -1
GH/TVL Ratio	0.52 (0.14), 0.13 to 1
Overall POPQ Score	2.2 (0.6), 1 to 4

Table 2: Details of final type of pessary in successful pessary users (n=201).

Pessary type	N(%)
Ring	117 (58.2%)
Ring with Support	44 (22%)
Gell	33 (16.4%)
Shelf	3 (1.5%)
Cube	4 (2%)

The difference was not statistically different between the two groups (p values single (0.187), double (0.513) and triple (0.124) compartment prolapse).

Table 2, Most commonly used pessary type was ring pessary (161{80%}). Other pessary types used are shown in table 2. Unsuccessful pessary types were ring pessaries (40/51 {78%}) and gellhorn (11/51{22%}).

Only seventeen women/201 (8%) had their type of pessary changed, 10/201 (5%) were upsized and 6/201 (3%) were downsized. The median size of pessary fitted was 50mm (range, 10–140mm), Subject characteristics were explored to see if they were predictive of whether pessary fitting would be successful or not (Table 3). The only variable that was found

Table 3: Predictors of patient variables on success of pessary fitting.

Patient Characteristics	N(%) or mean (SD), range		p value
	Successful Pessary Use n=201	Unsuccessful Pessary Use n=51	
Age (yrs)	64.9(15.7), 25-113	66.5(12.4), 24-88	0.489
BMI (kg/m ²)	30 (6.4), 21-52	27.7(3.3), 19-36	<0.001***
BMI normal (<25)	28 (13.9%)	7 (13.7%)	0.085
BMI overweight (25-29.9)	96 (47.8%)	32 (62.7%)	
BMI obese (≥ 30)	77 (38.3%)	11 (21.6%)	
Occupation			
Normal work	148 (73.6%)	31 (60.8%)	0.106
Heavy Lifting work	53 (26.4%)	19 (37.3%)	
Hormone Replacement Therapy (Yes)	92(45.8%)	20(39.2%)	0.401
Constipation (Yes)	83 (41.3%)	21(41.2%)	0.988
Collagen Disorders (Yes)	3 (1.5%)	1 (2%)	0.805
Smoking (Yes)	17 (8.5%)	4 (7.8%)	0.887
Parous (Yes)	199 (99%)	51 (100%)	1.00
Prior Hysterectomy (Yes)	55 (27.4%)	11 (21.6%)	0.402
Previous Repairs (Yes)	43 (21.4%)	8 (15.7%)	0.367
Instrumental Delivery (Yes)	59 (29.4%)	12 (23.5%)	0.410
Weight of Heaviest Baby (lb)	7.9 (0.94), 6-11	8.1 (0.84), 6.7-10	0.115

$p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Table 4: POPQ variables and hysterectomy status in women with successful (n=201) and unsuccessful (N=51) final pessary fitting.

POPQ Variables	Successful Pessary Fitting	Unsuccessful Pessary Fitting	p value ^a
	Mean (95% CI) or N (%)	Mean (95% CI) or N (%)	
Aa	-0.98 (-1.2 to -0.8)	-0.33 (-0.6 to -0.04)	<0.002**
Ba	-0.2 (-0.4 to 0.0)	0.49 (0.12 to 0.86)	0.002**
Ap	-1.6 (-1.8 to -1.4)	-1.6 (-2.0 to -1.2)	0.979
Bp	-1.0 (-1.2 to -0.8)	-0.96 (-1.4 to -0.5)	0.847
C	-2.8 (-3.2 to -2.4)	-2.1 (-2.8 to -1.3)	0.115
D	-4.99 (-5.2 to -4.8)	-5.0 (-5.3 to -4.8)	0.973
PB	2.1 (2.0 to 2.2)	1.8 (1.6 to 1.9)	<0.001***
TVL	8.8 (8.6 to 8.9)	8.4 (8.1 to 8.7)	0.047*
GH	4.3 (4.1 to 4.4)	5.0 (4.8 to 5.3)	<0.001***
GH/TVL ratio	0.49 (0.48 to 0.51)	0.62 (0.57 to 0.67)	<0.001***
Overall POPQ	2.2 (2.1 to 2.2)	2.3 (2.2 to 2.4)	0.198
Hysterectomy	55 (27.4%)	11 (21.6%)	0.401

^a Derived from Independent t test for continuous outcomes and Pearson X^2 for discrete outcomes Footnote: * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

to be a statistically significant predictor of successful pessary fitting was body mass index (BMI) ($p < 0.001$), having a higher BMI increased the odds of successful pessary fitting. For every incremental rise in BMI the chances of having a successful pessary fitted increased by 9%.

Table 4 displays the relevant POPQ variables and hysterectomy status in women with successful and unsuccessful final pessary fitting. Mean total vaginal length (TVL) was greater in women successfully fitted with pessary compared to those with an unsuccessful fit ($p = 0.047$). Mean genital hiatus (GH) and GH/TVL ratio were smaller in women successfully fitted with the pessary ($p < 0.001$). Short perineal body length and a low grade anterior wall prolapse (point Aa and Ba on POPQ) predicted successful fitting of pessary ($p < 0.001$ and $p < 0.002$ respectively) (Table 4).

Ap, Bp, C, D and overall POPQ scores and hysterectomy status were not statistically significant predictors for successful pessary fitting ($p > 0.05$).

Discussion

In this study, we had a high rate of successful pessary fitting. Most women were successfully fitted with a vaginal support pessary, and did not need to try more than two pessary sizes to achieve the appropriate fit. Larger total vaginal length, shorter genital hiatus, shorter genital hiatus/total vaginal length ratio, larger perineal body length and early stage anterior vaginal wall prolapse predicted successful pessary fitting. This may mean that in experienced hands, where more variations in pessary types and sizes are available, there is higher chance of successful pessary fitting. This has been seen in other studies [15,16].

There is a variation reported in the literature on successful pessary fittings in women with advanced prolapse (14% [18], 56% [19], 73% [20] and 78% [21]).

There is limited data on measures associated with successful pessary fitting [20,22,23]. Outcome of incontinence pessary fitting has been looked at by a few researchers and have also found conflicting results [21-24]. In our study the POPQ measures that proved helpful in predicting successful pessary fitting were larger total vaginal length, shorter genital hiatus, shorter genital hiatus/total vaginal length ratio, longer perineal body length and small stage anterior vaginal wall prolapse. Hysterectomy status did not determine success of pessary fitting.

Similar to our findings other researchers [21-23] found that a wider genital hiatus was associated with unsuccessful fitting of pessary in women with POP and incontinence. Donally [21] performed a retrospective cohort study to describe the use of incontinence pessaries in 239 women and did not find a difference in outcome of pessary fitting in women with variable genital hiatus measurements. This may be explained by the difference between the two groups as the women who use pessaries to treat stress incontinence are less likely to have had previous surgeries, and have a longer vaginal length and narrower genital hiatus as compared to women using pessary to treat POP.

Moreover with regards to the presence or absence of uterus and successful pessary fitting, results are again contradictory. Maito et al. [23], identified hysterectomy as a risk factor for unsuccessful pessary fitting in women with prolapse. Their study population were women with incontinence and/or pelvic organ prolapse who were offered referral to a midwifery pessary clinic. However the results by Nager et al. [25], are conflicting where the study population also included women with urinary incontinence and low stage POP and they found that hysterectomy did not predict unsuccessful pessary fitting. The latter results are in concordance to our study findings.

Strengths

To our knowledge, ours is the first study to evaluate women who were treated with vaginal support pessary with POP symptoms only. In this study all women with POP, irrespective of age or stage of prolapse were offered vaginal pessary as a non-surgical treatment option for POP. There was availability of a large number of various pessary types and sizes and were offered to women with all grades of prolapse.

Loss to follow-up in our study was minimal and therefore we were able to correctly identify women who were pessary fitting failures. We also considered factors in evaluating pessary fitting successes or failures that have not been assessed prior to this study such as heavy weight lifting /long hours of standing jobs, hormone replacement therapy, constipation etc.

Weakness

Our study was not randomised.

Conclusion

Pessary is mostly a successful fit in experienced hands and remains a viable treatment option in women with POP. Some POPQ measures can be of help in assessing successful pessary fitting in women with POP. We found that predictors of successful pessary fitting included larger total vaginal length, shorter genital hiatus, shorter genital hiatus/total vaginal length ratio, longer perineal body length and small stage anterior vaginal wall prolapse. Hysterectomy status did not determine success of pessary fitting.

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