

Systematic classification of uterine cervical elongation in patients with pelvic organ prolapse



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ABSTRACT

Objective: To define and classify cervical elongation, to compare uterine measurements after prolapse hysterectomy with a non-prolapse control group, and to associate stage of prolapse and degree of cervical elongation.

Study design: This was a single-centre retrospective case-control study conducted at the University Hospital, Urogynaecological Unit, with a certified urogynaecological surgeon. Data were collected from patients with and without pelvic organ prolapse (POP) who underwent laparoscopically assisted vaginal hysterectomy. Post-hysterectomy uterine cervical elongation was examined using the corpus/cervix ratio (CCR), calculated from measurements taken on photographs. Cervical elongation was classified as physiological (grade 0, CCR > 1.5) grade I (CCR > 1 and ≤ 1.5) grade II (CCR > 0.5 and ≤ 1), and grade III (CCR ≤ 0.5).

Results: Cervical elongation was detected in 288/295 (97.6%) patients in the prolapse group (grade I, 44/288 [15.2%]; grade II, 212 [73.6%]; grade III, 32 [11.1%]). Mean CCR was greater among those with stage II/III than among those with stage IV prolapse (1.0 ± 0.4 vs. 0.8 ± 0.2 ; $p < 0.001$). Grades of cervical elongation and prolapse stages were associated ($p < 0.001$). Grade I cervical elongation was detected in 26/69 (37.6%), grade II in 5/69, and grade III in 0/69 patients of the control group. Cervical elongation was found more often in the prolapse group compared to the control group ($p < 0.001$). Mean total uterine length did not differ between the prolapse and control groups (8.0 ± 1.6 vs. 8.2 ± 1.3 cm), but mean calculated cervical length was greater in the prolapse group than in the control group (4.4 ± 1.1 vs. 3.1 ± 0.8 cm; $p < 0.001$).

Conclusions: Uterine cervical elongation is found in patients undergoing hysterectomy for pelvic organ prolapse. Cervical elongation grades and prolapse stages are correlated. Defining uterine cervical elongation based on corpus/cervix ratio with grades I–III could be a valuable basic tool for further research.

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Introduction

The definition, prevalence, and classification of uterine cervical elongation remain unclear, although it is registered in the *International Classification of Diseases*. [1] Cervical elongation appears to be associated with pelvic organ prolapse (POP), but little information is available in the literature [2–4]. Especially in the

context of the controversy about uterus-preserving surgery for POP [5–7], various questions arise. For example, whether uterine cervical elongation influences outcome and recurrence rates of uterus-preserving pelvic floor surgery remains unknown. Case series have suggested that cervical elongation can re-develop or develop further after uterus-preserving surgery for POP [6,7], but confirmation of these observations is needed. Furthermore, the extent of cervical elongation that causes functional and/or subjective symptoms and should lead to treatment is undefined. Answers to these questions would be especially helpful for preoperative patient counselling concerning the decision to perform hysterectomy concomitantly with prolapse repair or to preserve the uterus when cervical elongation is present. Basic

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research is thus needed to define, classify, and more completely understand uterine cervical elongation.

This retrospective analysis of uterine proportions and cervical length after prolapse hysterectomy was conducted to contribute to the definition and classification of uterine cervical elongation in the clinical context of pelvic floor disorders. The incidence of cervical elongation after prolapse hysterectomy and correlation between the stage of prolapse and the degree of cervical elongation were investigated. Finally, the corpus/cervix-ratio (CCR), total uterine length, and calculated cervical length after prolapse hysterectomy were compared with measurements from a non-prolapse control group.

Materials and methods

Data from 332 consecutive patients who underwent laparoscopically assisted vaginal hysterectomy and vaginal native tissue repair for POP at the University Hospital between 2009 and 2014 were analysed retrospectively. Patients with symptomatic stage II–IV POP, according to the International Continence Society [8], were included. Reconstructive pelvic floor surgery consisted of anterior and posterior colporrhaphy and sacrospinous fixation, depending on the presenting pelvic compartment defect pattern. A certified pelvic floor surgeon performed all surgeries. Indications for hysterectomy were uterine pathology or patient demand.

Data from 160 consecutive patients who underwent laparoscopically assisted vaginal hysterectomy for endometrial hyperplasia or International Federation of Gynaecology and Obstetrics (FIGO) stage I endometrial cancer between 2008 and 2014 served as the control group. These diseases are not expected to affect the shape of the uterine corpus or cervix. Uterine preparation was assumed to have been similar in both groups. Only patients without a registered diagnosis of POP after gynaecological examination prior to surgery were included as a control. Medical records were identified and obtained using the hospital's database. Data on patients' age, body mass index, and uterine weight were

extracted from patient files. Surgical records were reviewed to determine prolapse stage and the availability of post-hysterectomy photographs documenting uterine anatomy. Two independent examiners took measurements of the uterine corpus and cervix on these photographs for CCR calculation (Fig. 1). Examiners were blinded to prolapse grade but not to diagnosis because data were collected and managed in separate files according to groups. Final measurements were agreed upon by consensus [2]. Measurements were taken from the external cervical os to the uterine isthmus, defined as the narrowest cervical point indicating the site of the internal cervical os [9]. CCR was obtained using the following formula:

$$CCR = \frac{Corp^b}{Cx^b}$$

where Corp^b is the uterine corpus measurement and Cx^b is the uterine cervical measurement obtained using the surgical report.

Cervical elongation was classified as follows: CCR > 1.5, physiological (grade 0); CCR > 1 and ≤ 1.5, grade I; CCR > 0.5 and ≤ 1, grade II; and CCR ≤ 0.5, grade III (Fig. 1).

Pathologists' reports were reviewed to obtain measurements of total uterine length. Based on the collected data, absolute cervical length was calculated using the following formula: $Cx^a = \frac{Cx^b \times Ut \text{ length}}{(Corp^b + Cx^b)}$, where Cx^a is the calculated cervical length, Cx^b is the uterine cervical measurement obtained using the surgical report, Ut length is the total uterine length from the pathology report, and Corp^b is the uterine corpus measurement obtained using the surgical report.

To show association between cervical elongation grades and prolapse grades we performed Chi² tests by using 4 × 2 contingency table.

Data were analysed using the Statistical Package for the Social Sciences (SPSS) software (version 15.0; SPSS Inc., Chicago, IL, USA). Student's *t*-test and the chi-squared test were used for descriptive analysis.

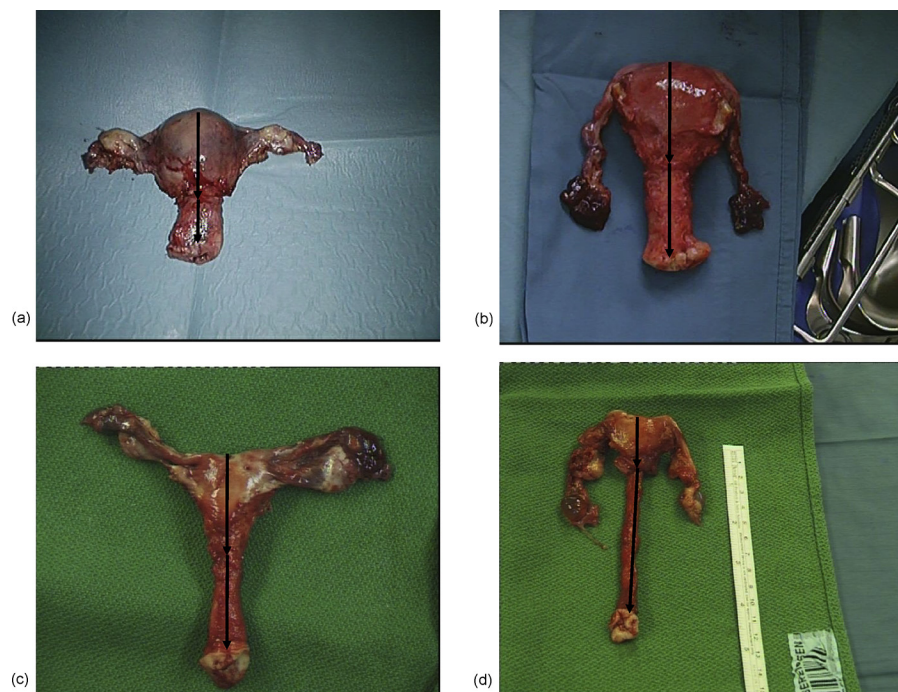


Fig. 1. Proposed classification of uterine cervical elongation. (a) Grade 0 (no elongation), (b) grade I, (c) grade II and (d) grade III.

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