



Adverse events in women with neglected vaginal pessaries for pelvic organ prolapse: a case report and literature review

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Background: The vaginal pessary is a simple, economical, safe and effective conservative treatment for symptomatic pelvic organ prolapse (POP). It rarely causes serious adverse effects of urethra, rectum and reproductive system, such as urinary retention, pessary impaction, urogenital fistula, malignant tumor. The occurrence of these rare complications is almost entirely related to long-term wearing and improper care. The purpose of the study was to review the published literature and describe adverse events in women with neglected vaginal pessaries for POP in order to draw more attention to the management of pessaries. This case is unique in terms of listing all cases of pessary impaction and cancers related to pessary, thus providing sufficient scientific basis on this topic.

Case Description: We report three cases of neglected pessaries developing impaction, cervical intraepithelial neoplasm (CIN) and endometrial cancer finally and summarize incarcerated vaginal pessaries and malignant tumors of the genital tract associated with neglected pessaries. There were only 20 case reports including 23 cases of incarcerated pessary in the English literature up to now, the median age was 76.5 years (51–91 years) accounting for the present case 1. Ring and Gellhorn were the most common pessary types among these studies, 20 (83.3%) and 3 (12.5%) patients, respectively. Among these cases, nearly 67% of these cases (16 of the 24 cases) found occurred between 3 and 40 years of neglected pessary, whereas only 4 cases happened rapid incarceration of ring pessary. Besides, there were 13 cases of malignant tumors of the genital tract associated with pessary use in available literature, the median age was 75 years (55–98 years).

Conclusions: The importance of periodical follow-up and appropriate care for patients with vaginal pessaries to prevent aforementioned adverse events should be attached. Patients who wear vaginal pessaries for a long time should regularly go to the hospital for vaginal and cervical examinations to exclude cervical and endometrial lesions. Future research is needed to determine consensus recommendations of follow-up and management and the effect of local estrogen therapy on reducing pessary related complications and to develop patient-specific pessaries for different individuals to provide appropriate therapeutic schedule.

Keywords: Vaginal pessary; pelvic organ prolapse (POP); neglected; adverse events; case report

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Introduction

Background

Pelvic organ prolapse (POP) is defined as pelvic organ displacement and decline caused by the defect or relaxation of pelvic floor supporting tissue, which has become one of the global public health problems affecting women's health and quality of life (1). There are generally no symptoms in the early stage of POP, patients will have varying degrees of lumbosacral discomfort, vaginal irregular bleeding, urination disorders, sexual dysfunction, vulva infection, etc., in the middle and late stages. The vaginal pessary is a device that supports the uterine and vaginal walls and keeps them in the vagina, which can restore the pelvic organs to their anatomical position. It is a simple, economical, safe and effective conservative treatment for symptomatic POP. The conservative therapy is used especially in the case of elderly frail women, medical complications that hinder surgery, women with fertility requirements or during pregnancy, patients unwilling to undergo surgery, those seeking symptom relief while awaiting surgery and POP patients with stress urinary incontinence (2). There are two types of pessaries: support type and space-filling type at present (3). Supporting pessary is placed in the posterior vaginal fornix to prevent POP by supporting the pubic bone or pelvic floor and are

currently the most widely used type in clinical practice. Ring pessary is the most commonly used supporting pessary due to its easy removal and replacement without affecting sexual life, and is commonly used for mild to moderate uterine prolapse. The space-filling pessary is generally larger in volume and is the first choice when the supporting pessary is not effective. The removal of this type of pessary is more difficult than that of ring pessary, and it is necessary to remove the pessary in the vaginal intercourse. A Gellhorn is a commonly used space-filling pessary for moderate to severe uterine prolapse or vaginal anterior and posterior wall prolapse (4).

Rationale and knowledge gap

The most common complications of wearing a pessary are unpleasant odor, vaginal discharge, bleeding, pain, and constipation. If POP patients are willing and able to remove, clean and replace the pessary themselves, complications can be effectively avoided. Pessaries rarely cause serious adverse effects of urethra, rectum and reproductive system, such as urinary retention, pessary impaction, urogenital fistula, malignant tumor, etc. (5). The occurrence of these rare complications is almost entirely related to long-term wearing and improper care. At present, there is no uniform standard for the follow-up and management of pessaries after wearing, which is largely based on the opinions of experts and the specific situation of patients. However, the importance of regular assessment must be stressed to all wearers, even if they feel comfortable or asymptomatic while wearing the pessary. At the beginning of wearing the pessary, patient satisfaction should be assessed after 1 to 2 weeks of wearing the pessary, and follow-up should be conducted every 3 months for the first year of wearing the pessary and every 6 months thereafter.

Objective

The aim of this study was to report three rare cases of neglected pessaries developing impaction, cervical intraepithelial neoplasm (CIN) and endometrial cancer finally and to summarize incarcerated vaginal pessaries and malignant tumors of the genital tract related to neglected pessaries, in order to emphasize the importance of use and care of the vaginal pessary. We present these cases in accordance with the CARE reporting checklist (available at <https://gpm.amegroups.com/article/view/10.21037/gpm-23-25/rc>).

Highlight box

Key findings

- Pessaries rarely cause serious adverse effects of urethra, rectum and reproductive system, such as urinary retention, pessary impaction, urogenital fistula, malignant tumor. The occurrence of rare complications about vaginal pessaries is almost entirely related to long-term wearing and improper care.

What is known and what is new?

- The vaginal pessary is a simple, economical, safe and effective conservative treatment for symptomatic pelvic organ prolapse.
- This is the first case to list all cases of pessary impaction and cancers related to pessary

What is the implication, and what should change now?

- Gynecologists and caregivers should inform pessary users in detail about the standard care of the pessary and the necessity of regular follow-up in order to avoid the occurrence of adverse events.
- Future studies are needed to determine consensus recommendations of follow-up and complication management, and to develop patient-specific pessaries for different individuals to improve patients' satisfaction with pessary use.



Figure 1 The front edge of the pessary was visible at the vaginal orifice.

Case presentation

Case 1

A 77-year-old vaginally grand multiparous woman who had been wearing a pessary for POP for more than 40 years presented with management of worsening vaginal pain. She had not regularly replaced and cleaned the pessary in the past 40 years. Three years prior to presentation, this patient developed vaginal pain, increased viscous leucorrhea, bloody vaginal secretions, and has been taking antibiotics intermittently until now. This patient's surgical history included open cholecystectomy and open bowel resection and anastomosis were performed because of intestinal perforation after intestinal polypectomy. There was no evidence of any other essential disease. Vaginal examination revealed a ring-shaped pessary was obliquely incarcerated in the middle and lower parts of the vagina, part of the front edge of the pessary was visible at the vaginal orifice, and the rest was embedded in the vagina walls (*Figure 1*). Rectal examination showed no abnormalities. The pelvic floor ultrasound showed that part of the pessary echo in the cervix of the upper part of vagina was semi-circular, and part of it seemed to be embedded in the cervical wall. A computed tomography (CT) scan showed a ring-like low-density image in the vagina, standing up and down, spreads the left and right-side walls of the vagina, and the

width of the middle of the vaginal cavity is about 6 cm without invasion of the bladder and rectum (*Figure 2*). Under general anesthesia, vaginal examination revealed an incarcerated ring pessary. The visible portion of the ring pessary was grasped and divided completely by cutting it into 4 pieces with a scalpel and the pessary was removed by sliding it through the epithelial tunnel out of the vagina (*Figure 3*). The pessary is about 5 cm in diameter. She was discharged on the next day and offered conjugated estrogen cream. She had no symptoms of POP and did not complain about vaginal discharge and other symptoms with 6 months of follow-up.

Case 2

A 69-year-old post-menopausal G4P4 Chinese woman originally presented with vaginal mass prolapse for more than 40 years. After all spontaneous deliveries, the patient consciously started to feel a mass out of the vaginal orifice, complaining of the mass increased after walking and increasing abdominal pressure, and it was completely reducible when lying on the bed. She had no symptoms of urinary incontinence, urinary irritation and constipation. Then she was referred to local hospital with a tubaeforme vaginal pessary (*Figure 4*) placement 40 years ago and not examined periodically. Before coming to our hospital, she was admitted to another institution for vulvar pruritus, the tubaeforme vaginal pessary had been removed and the cervical cytology indicated atypical squamous cells of unknown significance (ASC-US), further cervical biopsy showed that grade II–III cervical intraepithelial neoplasia (CIN II–III). She denied the history of hypertension, diabetes and heart disease. On vaginal examination, it was revealed that there was POP stage III [POP quantification (POP-Q): Aa +1, Ba +2, C -2, gh 4.5, pb 2, TVL 8, Ap +1.5, Bp +1.5, D -4] after pessary removal and an erosion surface with a size of about 1 cm × 1 cm can be seen on the posterior lip of the cervix. After a biopsy consultation in our hospital, she was diagnosed with CIN III. The patient underwent cervical conization, then she was performed the laparoscopic total hysterectomy, bilateral adnexectomy, Le Fort operation and perineosynthesis under the general anesthesia, after the intraoperative frozen pathological section showed no carcinoma. Postoperative pathological results revealed that CIN III (*Figure 5*). Vaginal ultrasound and cervical cancer screening showed no significant abnormalities during the six-month follow-up period.



Figure 2 Axial (A,B) and coronal (C,D) post-enhancement CT scans show the pessary is in the vaginal cavity (arrow in A,C), with the two ends (arrowheads in B,D) stretching the vagina bilaterally. Note that the bladder and rectum are not invaded. B, bladder; V, vagina; R, rectum.



Figure 3 The ring pessary was divided completely by 4 pieces with a scalpel and removed.



Figure 4 A tubaeforme vaginal pessary.

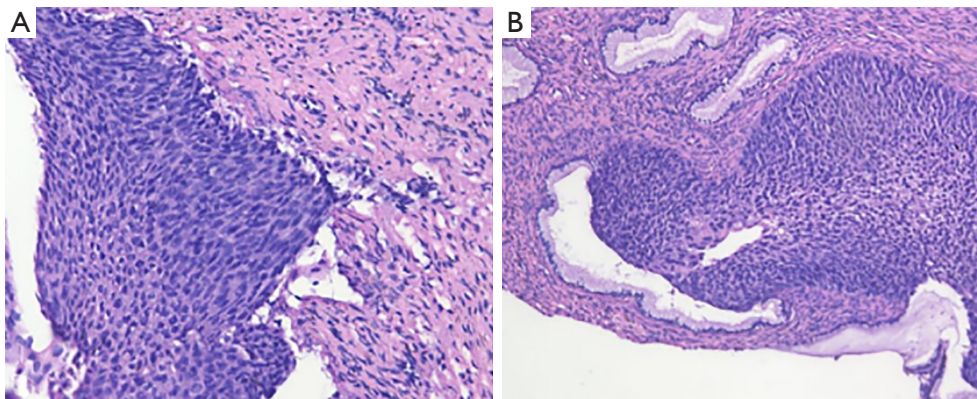


Figure 5 HE staining, original magnification $\times 200$. (A) Grade III cervical intraepithelial neoplasia. (B) Grade III cervical intraepithelial neoplasia involved glands. HE, hematoxylin-eosin.

Case 3

A 63-year-old Chinese woman was referred to our gynecology clinic with a 1-year history of postmenopausal vaginal bleeding. She had a clinical history for wearing vaginal pessary 5 years ago for symptomatic POP; however, she had not seen any gynecologist since then. She took out the pessary on her own before coming to our hospital. Vaginal ultrasound at our institution showed a strong echo approximately $3.5 \text{ cm} \times 2.4 \text{ cm} \times 3.8 \text{ cm}$ in the uterus cavity, the boundary with muscle wall partially was not clear, and abundant blood flow signal was detected, which suspected endometrial cancer, so we did not further evaluate the

stage of POP. Venous ultrasound of both lower extremities detected right calf intermuscular vein thrombosis. A CT scan showed did not show any characteristic of metastasis but a small amount of mural thrombus formation in the abdominal aorta and its branches. There is no surgical contraindication after consultation by vascular surgeon. She received low molecular weight heparin (LMWH) anticoagulant therapy for three days and stopped medication 24 hours before surgery. Intraoperative pathologic result from endometrial biopsy reported atypical endometrial hyperplasia with focal carcinoma. Then she underwent hysterectomy with bilateral salpingo-oophorectomy and bilateral pelvic and

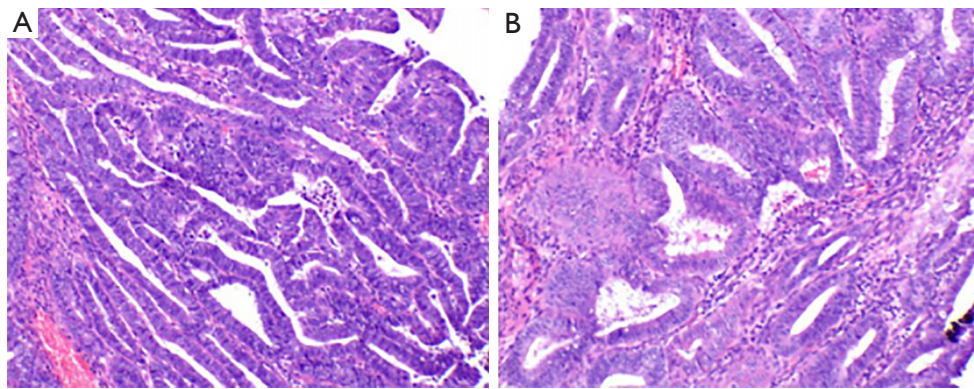


Figure 6 HE staining of highly differentiated endometrioid adenocarcinoma. (A, original magnification $\times 100$) and (B, original magnification $\times 200$) showed dense arrangement of neoplastic glands and cellular pleomorphism, and (A) was more typical. HE, hematoxylin-eosin.

para-aortic lymph node dissection. Pathological findings revealed that highly moderately differentiated endometrioid adenocarcinoma, International Federation of Gynecology and Obstetrics (FIGO) stage IB (*Figure 6*). This patient had been receiving LMWH anticoagulant therapy since surgery, but still developed pulmonary embolism on the 6th day after surgery. Fortunately, she was successfully discharged on the 10th day and it is recommended to continue taking rivaroxaban orally for at least 3 months. The patient was advised to undergo vaginal brachytherapy (VBT) or continue follow-up. The patient chose to continue follow-up and the test results at 3, 6 and 9 months after operation showed that tumor markers [cancer antigen (CA)125 and CA19-9] was within the normal range and vaginal ultrasound indicates no mass in the pelvic cavity. We will continue to follow-up this patient.

All procedures performed in this study were in accordance with the ethical standards of hospital Ethics Committee and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patients for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Discussion

POP is one of the common diseases of pelvic floor dysfunction, which occurs in up to 50% of parous women (6). Depending on the clinical symptoms and therapeutic purposes of POP, pessaries are mainly used to relieve prolapse symptoms, treat stress urinary incontinence, and improve intestinal symptoms and sexual function (3). They

are made of medical-grade silicone, which has the merit of making the devices inert and less likely to produce odors or cause allergic reactions (6). Researches show that 87% to 98% of clinicians report using pessaries in their clinical practice, while 77% of gynecologists regarding pessaries as one of the first-line treatment for POP (3,4). Two-thirds of women may choose a pessary as an initial management of their POP, most women who report successful pessary use at 4 weeks continue to use a pessary at 5 years (7,8). The ring support pessaries mainly apply to POP-Q stage I and II prolapse, while the space-occupying pessary is suitable for POP-Q stage III and IV prolapse and can be an alternative option when a ring pessary fails to keep in place or to alleviate prolapse (6). Optimal follow-up and management strategies of vaginal pessaries have no uniform standard, typically based on expert opinion and specific condition of patient. The patient should be seen again within 2 to 4 weeks to evaluate satisfaction including comfort, pessary contention, convenience, and relief of symptoms after well-fitting (6). It may be necessary to change the shape or size of the pessary to prevent it from being falling off by the Valsalva maneuver or movement. Providers should recommend that women who are able to self-care to remove the pessary every week to month and clean it with soapy water or water alone depending on their preference, and to undergo an office follow-up visit at least every 6 months. Women who cannot take care of themselves should initially be followed up every 3 months in the first year and 6-month intervals thereafter (6). The occurrence of adverse effects is almost entirely related to long-term wearing and improper care. Common complications of pessaries include vaginal bleeding, discharge, erosions, pain, discomfort and

infection. Complications rates vary from report to report. Bai *et al.* (9) reported a high complication rate of 73%, but more than 70% of women felt satisfied with the pessary and were reluctant to remove it, therefore indicating that these complications are not severe. These findings contrast with those of a study by Hanson *et al.* (10), who reported a low complication rate of 11%. Although the pessary is a relatively safe and effective treatment option for POP, serious adverse events still can occur such as urinary retention, pessary impaction, urogenital fistula, malignant tumor (5). Among them, 91% involved pessaries that had been neglected (6). Like the three pessary patients in our article, none of them had regular follow-up after wearing the pessary and adherence to treatment by health professionals. They came to our hospital with adverse events of pain, itching and bleeding respectively due to neglected pessary. We searched the PubMed and GeenMedical databases using the keywords “pessary”, “incarceration”, “neglected”, “impaction”, “entrapment”, and “case”, and found 20 case reports including 23 cases of incarcerated pessary in the English literature between 1977 and 2021, the median age was 76.5 years (51–91 years) accounting for the present case 1 (Table 1). Ring and Gellhorn were the most common pessary types among these studies, 20 (83.3%) and 3 (12.5%) patients, respectively. Among these cases, nearly 67% of these cases (16 of the 24 cases) found occurred between 3 and 40 years of neglected pessary, whereas only 4 cases happened rapid incarceration of ring pessary. The cause of rapid incarceration may be the presence of vaginal ulcers before insertion of the vaginal pessary and their healing occurred around the pessary (13). When vaginal pessaries remain unchanged for prolonged periods, chronic stimulation caused by the neglected pessary can lead to ulcers and re-epithelialization, which may be the reason for the vaginal pessary being clamped and difficulty in removal (2). Andrikopoulou *et al.* (25) described an unusual case of an elderly frail woman with multiple potential medical issues, manifested by an overlooked impacted pessary, resulting in occult vaginal bleeding and a large vaginal hematoma. Besides, Table 2 summarizes the information including malignant tumors of the genital tract associated with pessary use in available literature, the median age was 75 years (55–98 years). A few studies indicate that pessary use may be a causal mechanism for both vaginal and cervical cancers (32,35). CIN is the precancerous stage for cervical cancer, often occurs in women between the ages 25–35. The concurrence of cervical cancer with POP is rare, partly due to their

significantly different age distribution. Cervical cancers tend to occur at about 50 years old and become younger in average age whereas POP typically occurs in an older population of women 1–2 decades beyond the peak incidence of cervical cancers (36). Although the second patient in our case not diagnosed with cervical cancer, but if the patient did not pay attention to the symptoms of genital pruritus, the outcome may be different. Schraub *et al.* (35) reported a case series of 96 pessary users over 20 years at two institutions, in which 68 cases of cervical cancer and 28 cases of vaginal cancer were associated with pessary use. Since almost all tumors occurred at the site of pessary insertion, the authors concluded that chronic inflammation of foreign bodies associated with viral infection was the likely cause of cancers. Although, primary vaginal carcinoma is not common (accounting for 1–2% of gynecological malignancies), Jain *et al.* (32) reported that of 9 cases of vaginal cancer reported between 2003 and 2005, 2 cases of vaginal cancer occurred in patients using shelf pessaries. The exact mechanism of carcinogenesis is not known now, probably because neglected pessaries can lead to metaplasia and dysplasia of squamous mucosa. Interestingly, Dawkins *et al.* reported the first case of cervical cancer complicating POP using a pessary to restore anatomy for optimal radiation (36). Vanichtantikul *et al.* (37) reported a case of an old woman with multiple medical conditions presenting with POP stage IV combined with endometrioid adenocarcinoma was treated with radiotherapy and pessary placement. To our knowledge, the third patient was the first case to develop abnormal bleeding and endometrial cancer with a neglected pessary. Though it is not clear whether the endometrial cancer was associated with the neglected pessary, we should highlight the importance of close follow-up and periodic assessment for patients with vaginal pessaries to prevent aforementioned adverse events. All patients need to undergo cervical cancer prevention screening and endometrial ultrasound examination before placing vaginal pessary to exclude cervical and endometrial lesions. Vaginal ulcers and vaginitis should be treated before wearing a pessary. In menopausal women with estrogen deprivation, vaginal *Lactobacillus* species decrease and pH level increase can result in dysregulation of vaginal microenvironment or vaginitis (38). Otherwise, vaginal atrophy in menopause leading to dryness, dyspareunia, discomfort, and pruritus (39). Long-term pessary use may develop erosions of the vaginal mucosa, thereby exacerbating the above changes which can be reversed with local estrogen therapy. Based on expert opinion, topical

Table 1 Reported cases of incarcerated vaginal pessaries

Case	Author, year	Age, years	POP stage	Pessary type; size	Duration of pessary use	Examination	Treatment
1	Thornton, 1977, (11)	59	NA	Ring pessary; 95 mm	4 months	Gross ulceration of both anterior and posterior vaginal walls. Two areas of the anterior wall had fused over the pessary totally trapping it in the vagina	Local treatment with acriflavine packs and Savlon baths; perform a vaginal hysterectomy and repair operation
2	Poma, 1981, (12)	87	NA	Ring pessary; NA	NA	The pessary was mobilized due to adhesions and stenosis of the outer third of the vagina; the levator muscles contraction	Conjugated estrogen cream; the pessary was removed
3	Poma, 1981, (12)	79	NA	Gellhorn pessary; stem, 6 cm, diameter 7.5 cm	8 years	Changes in vulvar and vaginal atrophy and contraction of the levator muscles around the bottom of the disc prevent pessary movement, and adhesions prevented rotation around the stem	Conjugated estrogen cream; the pessary was removed
4	Poma, 1981, (12)	74	NA	Gellhorn pessary; NA	10 years	NA	The pessary was removed
5	Whitworth, 2002, (13)	73	Cystocele and rectocele with uterine descent POP-Q stage II	Ring pessary; 80 mm	5 months	The ring pessary was distinctly visible but cannot be removed with simple traction. Further examination showed a 2–3 cm bridge of vaginal mucosa, originating from the posterior vaginal wall and covering a portion of the ring	Remove the pessary by resecting a portion of it and then rotating the pessary until the excised portion was under the bridge of tissue
6	Chou, 2003, (14)	82	NA	Ring pessary; NA	>10 years	One third of the ring pessary was deeply embedded in the vaginal vault	The pessary was removed
7	Liang, 2004, (15)	70	NA	Ring pessary; 80 mm	>3 years	The ring-shaped pessary was embedded in the vaginal wall	The pessary was cut into two pieces and successfully removed
8	Ka Yu, 2004, (16)	51	NA	Three ring pessaries (54 mm/68 mm/74 mm)	2 months	After removing those two ring pessaries, it was found that the cervix was enveloped by the innermost ring pessary	The pessary was cut and removed
9	Nallendran, 2006, (17)	86	Uterovaginal prolapse with cystocele and rectocele POP-Q stage III	Ring pessary; 80 mm	10 years	The pessary was incarcerated in a band of vaginal tissue in the posterior vaginal wall	Removing the pessary by cutting out the band of vaginal tissue; vaginal hysterectomy with pelvic floor repair
10	Govind, 2007, (18)	75	Moderate cystourethrocele	Ring pessary; 80 mm	4 months	The pessary was embedded in the vaginal wall with a 3 cm band of tissue entrapping it	The pessary was severed by a bone cutter and passed through the epithelialised tunnel being released

Table 1 (continued)

Table 1 (continued)

Case	Author, year	Age, years	POP stage	Pessary type; size	Duration of pessary use	Examination	Treatment
11	Fernando, 2007, (2)	76	NA	Ring pessary; NA	4 years	The ring pessary was found to be embedded into the vaginal epithelium, forming a bridge on the pessary	An orthopedic bone cutter is used to grasp the visible part of the ring pessary and completely separate it, sliding the pessary out of the vagina through an epithelial tunnel
12	Fernando, 2007, (2)	77	NA	Ring pessary; NA	32 years	An incarcerated metal ring pessary	The metal ring with its fragmented latex covering was removed by digital separation from the vaginal skin
13	Sankar, 2008, (19)	79	NA	Ring pessary; 54 mm	Not reported	The pessary was bound by hard fibrous tissue which had greatly narrowed the vagina opening	The pessary was separated using an orthopedic bone cutter and easily removed in two parts
14	Berger, 2009, (20)	81	NA	NA	28 years	The pessary was found to be half visible, protruding through a midline skin defect under the introitus and one more posterior and lateral	Using an orthopedic "heavy cutter", the visible part of the pessary was removed, after which the perineal part was rotated out of the perineum
15	Dasari, 2012, (21)	60	NA	Metal ring	30 years	A metallic aluminum bangle with a diameter of 10 cm was found to be embedded in the vagina with dense fibrosis	One course of broad-spectrum antibiotics, doxycycline and metronidazole for 10 days; The vaginal fibrosis covering the ring was gently cauterized with a 40-watt unipolar cauterization then the ring was removed
16	Thubert, 2014, (22)	84	NA	Ring pessary; NA	5 years	Her vagina was protruding from her body, trapped within a ring pessary	Removal of the pessary requires a cold knife excision device; a new doughnut-shaped pessary was successfully installed in place
17	Manivasakan, 2013, (23)	55	NA	Ring pessary; NA	3 years	The posterior semicircle of the pessary was incarcerated in the posterior vaginal wall and the 2 cm vaginal epithelium band covered the ring	Under intravenous sedation, the vaginal bridge was incised with a scalpel, the incision was stanchied with catgut ligation, and the pessary was removed
18	Jain, 2014, (24)	72	Uterovaginal prolapse POP-Q stage II	Ring pessary; NA	12 years	A ring pessary was buried in vagina, with band of tissue overgrowing the ring of the fornix on both sides	The band of vaginal tissue needs to be cut and divided by the removal of the pessary under a short period of general anesthesia

Table 1 (continued)

Table 1 (continued)

Case	Author, year	Age, years	POP stage	Pessary type; size	Duration of pessary use	Examination	Treatment
19	Andrikopoulou, 2015, (25)	91	NA	Gellhorn pessary; NA	14 years	An impacted Gellhorn pessary in the vagina was noted with some spotting	Pessary removal under general anesthesia
20	Abdool, 2015, (26)	64	Cystocele POP-Q stage II	Ring pessary; 70 mm	NA	A thick band of granulation tissue (approximately 2 cm) had grown over the pessary	Local anesthetic was injected into the granulation tissue and the pessary was incised and removed
21	Cabral Ribeiro, 2017, (27)	87	NA	Ring pessary; NA	NA	A pessary intimately adhering to the vaginal wall with an intense inflammatory reaction	Removal of pessary
22	Ghanbari, 2019, (28)	84	NA	Ring pessary; NA	10 years	An entrapped ring pessary in severely atrophic vaginal mucosa with purulent discharge	After 10 days of treatment with vaginal estrogen and antibiotic (oral metronidazole 500 mg twice a day), the impacted pessary was removed from fibrotic vaginal bundles under spinal analgesia
23	Pereira, 2021, (29)	72	Genital prolapse POP-Q stage IV	Ring pessary	3 years	The anterior vaginal mucosa involved and wraps the posterior semicircle of the pessary, covering part of its 2-cm epithelium band	She underwent a mucosal incision and a pessary removal under local anesthetic
24	Present case	77	NA	Ring pessary	>40 years	A ring-shaped pessary was obliquely incarcerated in the middle and lower parts of the vagina, part of the front edge of the pessary was visible at the vaginal orifice, and the rest was embedded in the vagina walls	The visible portion of the ring pessary was grasped and divided completely by cutting it into 4 pieces with a scalpel and the pessary was removed by sliding it through the epithelial tunnel out of the vagina

POP, pelvic organ prolapse; NA, not available; POP-Q, POP quantification.

Table 2 Malignant tumors of the genital tract associated with pessary use

Case	Author, year	Age, years	Cancer type, stage	Pessary type; size	POP stage	Duration of pessary use	Vaginal examination	Treatment	Follow up
1	Russell, 1961, (30)	55	Vaginal cancer	Ring pessary; NA	NA	9 years	A crescent-shaped primary vaginal cancer involving the posterior fornix and the right wall of the vagina	NA	NA
2	Russell, 1961, (30)	66	Vaginal cancer	Ring pessary; NA	NA	10 years	An ulcerating carcinoma of the vagina involving the posterior fornix and the right upper half of the right vaginal wall	NA	NA
3	Russell, 1961, (30)	74	Vaginal cancer	Ring pessary; NA	NA	Over 40 years	A horseshoe-shaped cancer of the vagina involving the anterior and both lateral walls	NA	NA
4	Russell, 1961, (30)	84	Vaginal cancer	Ring pessary; NA	NA	10 years	An extensive cancer of the vagina involving the posterior fornix and extending round both lateral walls almost as far as the urethra	NA	NA
5	Russell, 1961, (30)	75	Vaginal cancer	Ring pessary; NA	NA	20 years	A crescent-shaped cancer involving the posterior fornix and right vaginal wall	NA	NA
6	Russell, 1961, (30)	77	Vaginal cancer	Ring pessary; NA	NA	50 years	A crescentic cancer of the upper vagina involving the fornix and both lateral walls	NA	NA
7	Martin, 2013, (31)	72	Vaginal cancer, II	Gellhorn pessary; NA	NA	7 years	A necrotic mass measured approximately 4 cm x 6 cm x 3 cm on the right vaginal wall, apex, and rectovaginal septal area was noted	Vaginal brachytherapy	NA
8	Jain, 2016, (32)	96	Vaginal cancer	Shelf pessary; NA	NA	Several years	A nodule of about 1 cm in diameter was noted on the right lateral wall of the vagina	No	Died within a few months due to other medical problems
9	Jain, 2016, (32)	88	Vaginal cancer	Shelf pessary; NA	NA	Over 7 years	An induration over the posterior vaginal wall with contact bleeding was noted	No	Died a few months later
10	Akino, 2016, (33)	60	Vaginal cancer, IVb	Ring pessary; NA	III	Over 11 years	A 4-cm vaginal tumor became apparent at the right vaginal wall	Chemotherapy using paclitaxel (175 mg/m ²) and carboplatin (AUC =6) was administered	Live and lung metastases, died of disease after two courses of chemotherapy

Table 2 (continued)

Table 2 (continued)

Case	Author, year	Age, years	Cancer type, stage	Pessary type; size	POP stage	Duration of pessary use	Vaginal examination	Treatment	Follow up
11	Tan, 2021, (34)	81	Vaginal cancer	Ring pessary; 80 mm	IV	4 years	There was a vaginal wall ulcer in the posterior fornix measuring 3 cm x 3 cm	Vaginal hysterectomy and bilateral salpingo-oophorectomy, sacrospinous fixation, anterior and pelvic repair; posterior floor vaginal brachytherapy and 25 fractions of external beam radiotherapy	Four months after completion of radiotherapy showed that there was a tumor recurrence at the vaginal vault with bilateral hydronephrosis and died a few months later
12	Tan, 2021, (34)	72	Vaginal cancer	Ring pessary; NA	III	10 years	A foul smelling friable fungating mass on the left vaginal wall measuring 5 cm x 3 cm	Six cycles of neoadjuvant chemotherapy with paclitaxel and carboplatin	Prior to the planned surgery, she had atrial fibrillation and died
13	Tan, 2021, (34)	98	Vaginal cancer	Ring pessary; 71 mm	IV	7 years	A friable induration measuring 4 cm x 3 cm was seen in the posterior fornix	The patient declined further imaging investigation	Died about a year later

POP, pelvic organ prolapse; NA, not available; AUC, area under the curve.

estrogen therapy is recommended in conjunction with pessary use to prevent or treat vaginal erosions (38). We need to inspect the vaginal mucosa carefully and allow any areas of ulceration to heal with the help of local estrogen cream which soften the fibrotic tissue and make the vagina more supple prior to insertion of a pessary. With patience and the application of local estrogen cream, the incarcerated pessaries can also be easily removed. For the effect of estrogen on vaginal complications of pessary use, the latest meta-analysis provided an answer that local estrogen in combination with a pessary could decrease the bacterial vaginosis rate among postmenopausal women with POP but there is no consensus on decreasing other pessary complications. Additional multicenter randomized controlled trials with large sample sizes should be conducted to better understand the effects of local estrogen use on reducing pessary-related complications (40). The indications and contraindications of wearing pessary should be strictly controlled. There are almost no absolute contraindications of vaginal pessaries, the patients with senile dementia, cognitive impairment and mental disease are not under control need specially-assigned person to care, we should weigh the pros and cons before making a decision otherwise. In order to optimize the safe use of pessaries, providers must be aware of the risks and benefits associated with pessaries, be vigilant during the necessary follow-up, and be prepared to appropriately refer women with pessary related problems beyond their scope of practice (5). Regular follow-up at scheduled visits is important to prevent adverse events in women with neglected vaginal pessaries through early interventions, such as refitting for pessary size and shape, temporary or permanent pessary removal, treatment of any active infection, and/or modifying the vaginal environment with acidifying products or vaginal estrogen (5). The findings of this study have to be seen in light of some limitations: Firstly, these patients wore the pessary for different lengths of time, so it is not clear how long it would take to develop complications. Therefore, the importance of self-care and regular follow-up must be emphasized. Secondly, the sample size of this paper was too small and this review is based on the author's own analysis and summary of the existing literature which were mainly case reports, prospective randomized and controlled design researches are needed to be conducted in the future.

Conclusions

In order to avoid the occurrence of adverse events,

gynecologists and caregivers should inform pessary users in detail about the standard care of the pessary and the necessity of regular follow-up. All patients need to undergo cervical cancer prevention screening and endometrial ultrasound examination prior to placement of the vaginal pessary to rule out cervical and endometrial lesions and to examine periodically so that adverse effects can be dealt with early. Local estrogen therapy can be recommended properly in conjunction with pessary use for postmenopausal women. Future studies are needed to identify consensus recommendations of follow-up and complication management and the effect of local estrogen therapy on reducing pessary related complications and to develop patient-specific pessaries for different individuals to offer appropriate treatment options, thus improving patients' satisfaction with pessary use.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of hospital Ethics Committee and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patients for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office

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