Guidelines for the Prevention of Vaginal Stenosis in Women with Gynecological Cancer after Pelvic Brachytherapy in Radiotherapy Services in Brazil

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Orientações para Prevenção da Estenose Vaginal em Mulheres com Câncer Ginecológico Pós-Braquiterapia Pélvica nos Serviços de Radioterapia no Brasil

Directrices para la Prevención de la Estenosis Vaginal en Mujeres con Cáncer Ginecológico Después de la Braquiterapia Pélvica en los Servicios de Radioterapia en el Brasil

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ABSTRACT

Introduction: Vaginal stenosis can occur after pelvic brachytherapy, leading to sexual dysfunction that makes gynecological examinations for cancer follow-up difficult or impossible. **Objective:** To evaluate measures to prevent vaginal stenosis after brachytherapy for gynecological cancers in radiotherapy centers in Brazil. **Method:** Observational cross-sectional study with data collection between June and December 2022, through a Google Forms questionnaire sent to public, philanthropic and private radiotherapy services in Brazil by e-mail. **Results:** A total of 43 responses were obtained, where 34 (79%) institutions reported performing pelvic brachytherapy and 33 (77%) reported advising patients on stenosis prevention. The main guidelines provided were the use of vaginal dilators (32-97%), stimulation of sexual activity with penetration (27-82%), pelvic physiotherapy (22-66%) and use of topical solutions (16-48%). In most radiotherapy centers, guidance is given at the first radiotherapy appointment, with the most frequent indication being the use of dilators, starting two weeks after the end of brachytherapy, continuing for more than 36 months, without discontinuation, three times a week, once a day, for 10 to 15 minutes. **Conclusion:** Most radiotherapy services in Brazil that carry out brachytherapy and took part in the study provide patients with guidance on preventing vaginal stenosis and the most common measure is use of vaginal dilators, in addition to stimulation of sexual activity with penetration, use of topical solutions and pelvic physiotherapy.

Key words: Genital Neoplasms, Female/Radiotherapy; Constriction, Pathologic/radiotherapy; Brachytherapy.

RESUMO

Introdução: A estenose vaginal pode ocorrer após a braquiterapia pélvica, levando a disfunções sexuais que dificultam ou impossibilitam os exames ginecológicos de seguimento oncológico. **Objetivo:** Avaliar as medidas de prevenção de estenose vaginal pós-braquiterapia para cânceres ginecológicos em centros de radioterapia do Brasil. **Método:** Estudo observacional transversal com coleta de dados entre junho e dezembro de 2022, por meio de questionário via *Google Forms*, enviado por e-mail aos serviços públicos, filantrópicos e privados de radioterapia no Brasil. **Resultados:** Obteve-se um total de 43 respostas, em que 34 (79%) instituições relataram realizar a braquiterapia pélvica e 33 (77%), orientar as pacientes quanto à prevenção de estenose. As orientações ministradas foram o uso de dilatadores vaginais (32-97%), estímulo à atividade sexual com penetração (27-82%), fisioterapia pélvica (22-66%) e uso de soluções tópicas (16-48%). Na maioria dos centros de radioterapia, a orientação ocorre na primeira consulta da radioterapia, sendo a indicação mais frequente o uso de dilatadores, que pode ser iniciado duas semanas após o término da braquiterapia, prosseguindo por mais de 36 meses e sem interrupção de uso, três vezes por semana, uma vez ao dia, de 10 a 15 minutos. **Conclusão:** Majoritariamente, os serviços de radioterapia do Brasil que realizam braquiterapia e que participaram do estudo fornecem às pacientes orientações sobre prevenção de estenose vaginal, sendo o uso de dilatadores vaginais a medida mais utilizada, além de estímulo à atividade sexual com penetração, uso de soluções tópicas e fisioterapia pélvica.

Palavras-chave: Neoplasia dos genitais femininos/radioterapia; Constrição Patológica/radioterapia; Braquiterapia.

RESUMEN

Introducción: La estenosis vaginal puede ocurrir después de la braquiterapia pélvica, lo que lleva a la disfunción sexual que dificulta o imposibilita los exámenes ginecológicos para el seguimiento del cáncer. **Objetivo:** Evaluar las medidas de prevención de la estenosis vaginal después de la braquiterapia para cánceres ginecológicos en centros de radioterapia en el Brasil. **Método:** Estudio observacional transversal con obtención de datos, entre junio y diciembre de 2022, mediante un cuestionario a través de *Google Forms*, enviado por correo electrónico a los servicios de radioterapia públicos, filantrópicos y privados del Brasil. **Resultados:** Se obtuvo un total de 43 respuestas, donde 34 (79%) instituciones informaron realizar braquiterapia pélvica y 33 (77%) informaron asesorar a los pacientes sobre la prevención de estenosis. Entre las pautas dadas encontramos el uso de dilatadores vaginales (32-97%), estimulación de la actividad sexual con penetración (27-82%), fisioterapia pélvica (22-66%) y uso de soluciones tópicas (16-48%). En la mayoría de los centros de radioterapia, la orientación se da en la primera cita de radioterapia, siendo la indicación más frecuente el uso de dilatadores a partir de dos semanas después del final de la braquiterapia, mantenidos durante más de 36 meses y sin límite de interrupción de su uso, tres veces por semana, una vez al día, durante 10 a 15 minutos. **Conclusión:** La mayoría de los servicios de radioterapia de Brasil que realizan braquiterapia y participaron en el estudio orientan a las pacientes sobre la prevención de la estenosis vaginal, siendo el uso de dilatadores vaginales la medida más utilizada. El fomento de la actividad sexual con penetración, el uso de soluciones tópicas y la fisioterapia pélvica también son medidas recomendadas.

Palabras clave: Neoplasias de los Genitales Femeninos/radioterapia; Constricción Patológica/radioterapia; Braquiterapia.

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INTRODUCTION

Gynecological cancers include cervix, endometrial, ovary, vaginal and vulvar cancer. Of those, the most frequent types of cancer in Brazil are cervix, ovary and endometrial, with an estimated incidence of 17,010, 7,310, and 7,840 new cases, respectively, for each year of the 2023-2025 period[1,2].

The treatment of gynecological cancer can be multimodal and include surgery, chemotherapy, and radiotherapy, with the possibility of applying these treatments individually, associated, or even concomitantly[3]. Specifically for cervix cancer, the treatment will depend on the staging of the disease, as the patient may be submitted to a total or radical hysterectomy, with or without lymphadenectomy, or radiotherapy and chemotherapy[4,5].

Pelvic radiotherapy is usually conducted in patients with cervix, endometrial, and vaginal cancer[6]. There are two radiotherapy treatment modalities, teletherapy and brachytherapy. In the first one, ionizing radiation is done through an external beam, far from the skin. In the second one, radiation sources are applied via catheters or intracavitary probes, at a few centimeters of the tumoral bed or inside the tumor that must be irradiated[7]. Brachytherapy can be applied in high and low doses: high dose corresponds to a treatment in which the dose is over 0.2 Gy/min (or 12 Gy/h), with a mean between 2 and 12 Gy/h, and low dose is between 0.4 and 2 Gy/h[8,9].

Pelvic radiotherapy is important for reducing recurrences and lethality in women with gynecological cancer. However, irradiated patients are exposed to radiotherapy-induced toxicity, which can still be associated to other morbidities related to surgeries and chemotherapy[10]. Vaginal stenosis is a narrowing and/or shortening of the vaginal canal, a late clinical complication that usually manifests one to three years after brachytherapy. The condition is associated to a decrease or absence of lubrication, formation of adherences and fibrosis, with a relevant loss of vaginal elasticity[11].

According to the Brazilian Society of Radiotherapy (SBRT)[12], there are over 245 radiotherapy services all over Brazil, of which 99 perform brachytherapy. However, there are no records on the literature about the guidance provided to patients in these services for preventing post-pelvic brachytherapy vaginal stenosis, nor evidence-based national or international protocols.

The present study carried out a survey of measures to prevent post-brachytherapy vaginal stenosis for gynecological cancers in radiotherapy centers that perform pelvic brachytherapy in Brazil. In addition, it assessed which services perform pelvic brachytherapy, types of gynecological cancer treated in the surveyed institutions and which professionals perform this treatment.

METHOD

Observational cross-sectional study carried out from June to December 2022, including professionals over 18 years-old, responsible for the radiotherapy/brachytherapy sectors of 34 private, public, and philanthropic radiotherapy services in Brazil, listed on the SBRT website. There was no sample size calculation, since all the radiotherapy centers were invited to participate in the study. The exclusion criteria were cases in which professionals at radiotherapy centers in charge of providing guidance to patients receiving pelvic radiotherapy did not respond to the study questionnaires after three attempts to contact the researchers (twice by email and once by telephone), those who did not agree to answer the questionnaire or professionals who reported that the radiotherapy centers to which they belong are inactive.

Radiotherapy centers in Brazil received an informative e-mail from the SBRT about the survey with information on the study, inviting the people in charge of the radiotherapy/brachytherapy sectors to take part, provided the institution cared for gynecological cancer.

Data were collected through an assessment instrument elaborated by the authors using the Google Forms platform to create a prefilled questionnaire, based on scientific literature about preventing pelvic brachytherapy-induced vaginal stenosis. The questionnaire was sent to the public and private radiotherapy services in Brazil listed on the SBRT website, instructing that it should be preferably answered by the person in charge of guiding pelvic radiotherapy patients in treatment for gynecological cancer or by one of the team members (doctors, nurses, nurse technicians, physiotherapists, radiotherapy technicians) of the pelvic brachytherapy sector who follow up and guide patients.

The invitation was sent requesting a response within ten days from the date of sending. In case no answer was received within that deadline, a follow-up e-mail was sent, reminding of the study, and offering ten more days to fill the questionnaire. When no answer was received after the second deadline, the study researchers performed an active search on the Internet to find the contact information of the institution with the objective of calling and attempting to speak with the person in charge about the study. Once the person in charge was reached and their participation confirmed, the questionnaire was resent to them with a ten-day deadline for responding. If the radiotherapy center responded in any of the first two contact attempts that they did not wish to take part in the study, no

other invitation would be sent to them. The contacted professionals who accepted to participate in the study had to agree with the Informed Consent Form (ICF) for research in a virtual environment, which was accessed just before the start of the questionnaire questions.

The present study was approved by the Research Ethics Committee (CEP) of the *Universidade Federal de São Paulo*, approval report number 5453695 (CAAE (submission for ethical review): 55883622.8.0000.5505), in compliance with Resolution 466/12[13] of the National Health Council.

The instrument used for data collection started asking the profession of the responder and if the service provided pelvic brachytherapy for gynecological cancer. If the respondent answered that the center did not perform pelvic brachytherapy, the questionnaire would be ended. Upon an affirmative answer, the questionnaire would continue, with objective questions about what kind of guidance did the institution provide for preventing vaginal stenosis (none, sexual intercourse, vaginal dilators, pelvic physiotherapy, topical solutions) and when should the guidance start being followed (before, during, or a certain time after finishing the pelvic brachytherapy treatment), frequency (times a week and per day), and duration of dilation (how long they should be kept in the vaginal canal). In addition, the instrument also enables to map the services that provide pelvic brachytherapy in Brazil, the type of gynecological cancer treated in the brachytherapy institution, and which professionals are responsible for providing guidance on prevention of vaginal stenosis, if applicable.

Data were compiled for descriptive analysis using the Microsoft Excel software, in which the categorical data were represented by absolute and relative frequencies. The descriptive analysis was performed by the statistical software Jamovi[14], version 2.4.14.

RESULTS

A total of 89 institutions registered on the SBRT website were found. A total of 43 responses were obtained, in which 34 (79%) institutions performed pelvic brachytherapy and 33 (77%) reported they provide guidance on preventing vaginal stenosis. (Figure 1).

The mapping of institutions that responded to the questionnaire regarding the performance of pelvic brachytherapy for gynecological cancers, professional in charge of the sector, and if they provide or do not provide guidance to prevent vaginal stenosis is described in Table 1.

Regarding the moment in which the first guidance towards preventing vaginal stenosis is provided to women, of the 33 institutions, 18 (54.6%) declared to do it at the

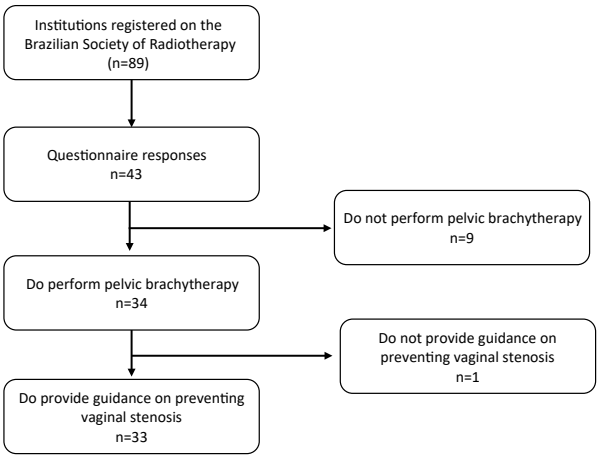

Figure 1. Flowchart of inclusion of Brazilian radiotherapy centers

first radiotherapy appointment, 9 (27.3%) at the end of brachytherapy, 3 (9.1%) in the radiotherapy planning appointment, 2 (6%) at the end of teletherapy, and 1 (3%) at another moment.

As to the use of measures to prevent vaginal stenosis, the instruction to use vaginal dilators was given by 32 institutions (97%), followed by stimulating sexual activity with penetration, pelvic physiotherapy, and use of topical solutions (Figure 2).

The centers had the option to mention, in an open question, other types of guidance. One institution recommended the use of laser and another recommended vaginal douche. Of the 33 institutions who responded that they provide guidance on preventing vaginal stenosis, 32 (97%) recommended the use of vaginal dilators. They diverged, however, as to when to start using the device, for how long, how many times, and how long each session should be.

Figure 3 shows the data regarding the guidelines for when to start using vaginal dilators (a), how long the use of dilators is recommended after the end of pelvic brachytherapy (b), what is the recommended frequency of using dilators throughout the week (c) and how long, in minutes, the dilator should remain in the vaginal canal with each use (d).

Regarding the days advised to use the dilator, 28 institutions (84.9%) advised to use it once a day, four centers (12.1%) advised to use it twice a day, and one (3.0%) reported it is at the patient's discretion. Only 7 (21.2%) provided dilators to the patients, of those, four centers provided standard size dilators for all patients, while three centers provided individualized size dilators, chosen upon physical assessment of patients.

Of the 32 (97.0%) centers that recommend the use of vaginal dilators, 60.6% reported that all women are advised and 36.4% that only non-sexually active women,

Table 1. Mapping of radiotherapy services in Brazil, 2022

	Responded the questionnaire n = 43	Perform brachytherapy n = 34	Guide on stenosis prevention n = 33
Type of institution			
Private	17	15	14
Philanthropic	14	12	12
Public	12	7	7
Professional who responded the questionnaire			
Doctor	38	29	28
Nurse	4	4	4
Physiotherapist	1	1	1
Types of pelvic cancer serviced in the centers that perform brachytherapy			
Cervix	--	34	33
Endometrial	--	34	33
Vaginal	--	31	30
Vulvar	--	21	20
Sarcoma	--	18	18
Lymphoma	--	24	23
Melanoma	--	33	32
Annex	--	2	2

Note: Data expressed in number of centers that responded to the variables.

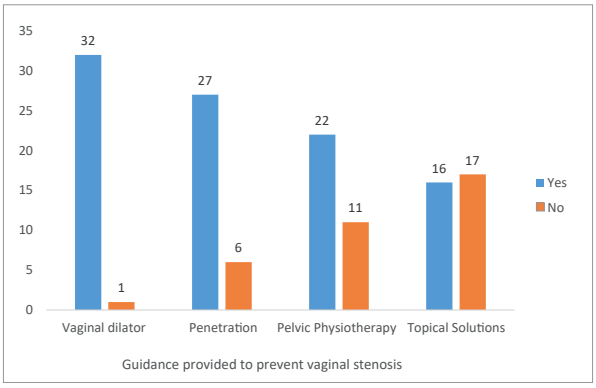

Figure 2. Guidance provided by the Brazilian radiotherapy services to patients who performed brachytherapy in 2022

and 30 of those centers advise the use of vaginal dilators associated to vaginal lubricants.

The data regarding recommendation of sexual activity with penetration, use of vaginal creams, and pelvic physiotherapy are described in Table 2.

Most of the institutions (27-81.8%) provide verbal and in-person guidance on preventive measures for post-brachytherapy vaginal stenosis to patients, while 5 institutions (15.1%) provide guidance through printed or online manuals, and one radiotherapy institution uses a different method to provide guidance. The health professionals that perform preventive clinical monitoring of vaginal stenosis are nurses in nine (27.3%) of the researched centers, physiotherapists in eight (24.2%) centers, gynecologists in 11 (33.3%) centers, and radiotherapists in 12 (36.4%) centers. Six institutions (18.2%) reported that patients are not monitored for vaginal stenosis prevention. In this questionnaire item, it was possible to assign more than one professional responsible for this role.

DISCUSSION

Given the current scenario, there are no fixed guidelines on the literature for prevention of vaginal stenosis. This can be considered the first Brazilian research in the whole national territory to aim at explaining the main guidance provided for this purpose. The results of this study clarified the main guidelines and behaviors of institutions provided to patients that are prone to developing vaginal stenosis.

The main gynecological cancer types treated by the institutions are cervix, endometrial, and vaginal cancer. According to the National Cancer Institute (INCA)[1], cervix cancer comes in third as the most frequent gynecological cancer, with 17,010 new cases predicted. Endometrial cancer, however, comes in seventh in women around the world. The same three gynecological

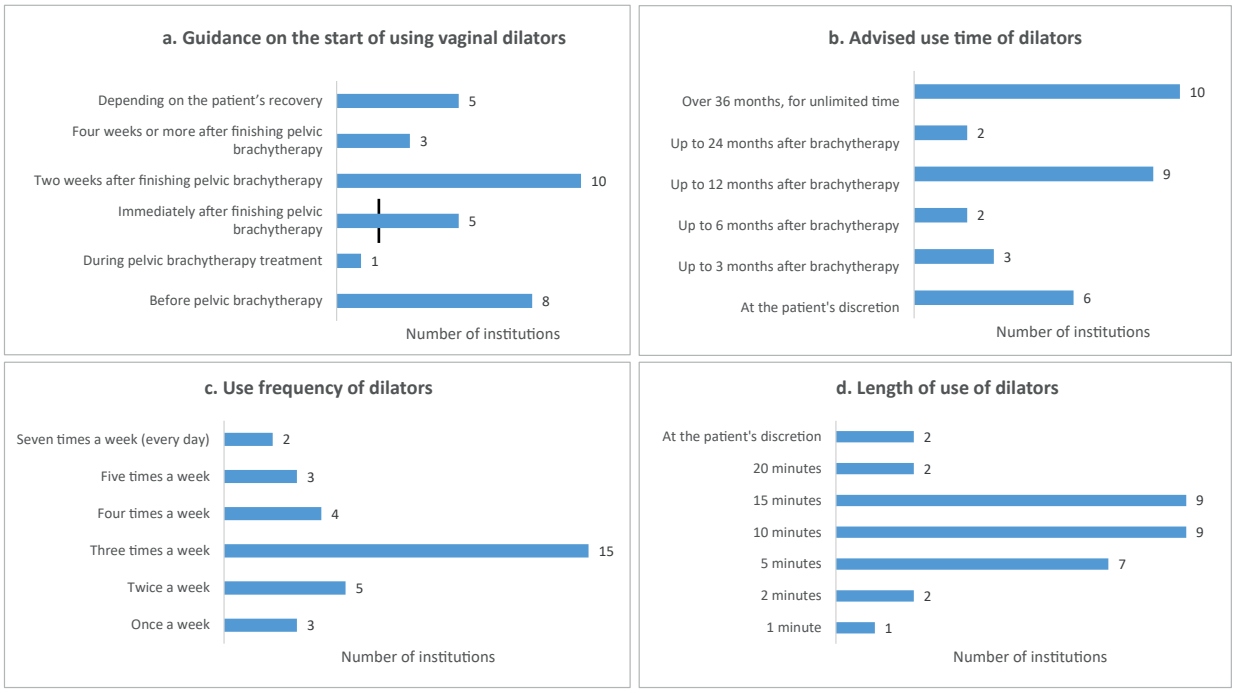

Figure 3. Guidance on the use of vaginal dilators to prevent vaginal stenosis in Brazilian radiotherapy services in 2022: a. Guidance on the start of using, b. Advised use time, c. Use frequency, d. Length of use of dilators

cancers have been described as the most frequent in pelvic radiotherapy clinics in New Zealand[15].

Guidance on vaginal stenosis is provided by 54.6% of the institutions on the first radiotherapy appointment, as described by Summerfield and Leong[15], in which most patients received guidelines on preventing vaginal stenosis on their first radiotherapy appointment. In line with those findings, the Brazilian version of the consensus for prevention of vaginal stenosis, elaborated by Matos et al.[16], highlights the instructions on sexual rehabilitation with the use of vaginal dilators, which must be provided by the radiotherapist before treatment, followed by guidance on vaginal dilation and sexual activity upon the first contact with the patient, and fully reinforced by the nurse on the following appointments[17]. Both the national[14] and international[15] consensus currently published, the latter performed by a team of Dutch researchers, describe the importance of the interdisciplinary team's responsibility in providing information on preventing post-pelvic brachytherapy vaginal stenosis. However, consensus is based on the opinion and expertise of specialists and not in controlled clinical trials or systematic reviews, which can justify the lack of a solid scientific basis that enables the standardization of guidelines provided by the different institutions assessed in this study.

Summerfield and Leong[15] obtained a similar result to this study in research conducted in the radiotherapy departments of New Zealand, that aimed to identify the habit of recommending preventive practices for vaginal stenosis in women treated with pelvic radiotherapy. The departments recommended the use of vaginal dilators together with lubricants for patients regardless of them being sexually active or inactive, starting at three times a week, from 6 to 36 months. In this research, the most emphasized prevention instruments by institutions were vaginal dilators, sexual relations with penetration, especially at the end of pelvic brachytherapy. In accordance with those findings, several studies reported the importance of using vaginal dilators post-radiotherapy for preventing vaginal stenosis[18-20].

According to the Brazilian consensus[16], therapy with dilators should be conducted for at least 5 to 10 minutes and from two to three times a week, individually planned for each case and for an unlimited time. The results of this research highlight the use frequency of dilators for 10 to 15 minutes twice or three times a week, for an unlimited time. In the findings by Charatsi *et al.*[20], who verified the efficacy of vaginal dilators, its use is recommended from twice to three times a week, for 10 to 15 minutes throughout the course of 12 months.

Finally, the study by Stahl *et al.*[11] verified that women who undergo high dose intravaginal brachytherapy have a risk of developing vaginal stenosis even after a year of brachytherapy and reported that increasing the period of use of vaginal dilators for over a year can reduce this risk[11,16,20].

The literature has constantly pointed that adherence to vaginal dilators is an issue[19,21]. This is usually related

Table 2. Guidance about penetration, physiotherapy, and vaginal topical solutions in Brazilian radiotherapy services in 2022.

Sexual activity with penetration		
Guidance on when to start penetration	**n**	**%**
Depending on the patient's recovery	5	15.2
At the patient's discretion	6	18.2
During pelvic brachytherapy treatment	1	3.0
Immediately after finishing pelvic brachytherapy	4	12.1
Two weeks after finishing pelvic brachytherapy	11	33.3
Four weeks or more after finishing pelvic brachytherapy	4	12.1
Service does not provide guidance on preventing stenosis	2	6.1
Penetration frequency		
Seven times a week (every day)	1	3.0
Four times a week	1	3.0
Three times a week	13	39.4
Twice a week	9	27.3
Once a week	4	12.1
Service does not provide guidance on preventing stenosis	5	15.2
Pelvic physiotherapy		
Guidance on when to start pelvic physiotherapy		
Depending on the patient's recovery	3	9.1
Before pelvic brachytherapy	7	21.2
Immediately after finishing pelvic brachytherapy	7	21.2
Two weeks after finishing pelvic brachytherapy	2	6.1
Four weeks or more after finishing pelvic brachytherapy	3	9.1
Service does not provide guidance on preventing stenosis	11	33.3
How is the access to pelvic physiotherapy		
There is a pelvic physiotherapist in the institution	9	27.3
Refers patients to specific professionals	6	18.2
Guides patients to consult pelvic physiotherapy professionals	7	21.2
Service does not recommend pelvic physiotherapy	11	33.3
Vaginal topical solutions		
Guidance on when to use vaginal topical solutions		
Before, during, and after pelvic brachytherapy	7	21.2
During and after pelvic brachytherapy	3	9.1
After finishing pelvic brachytherapy	11	33.3
Service does not recommend the use of vaginal topical solutions	12	36.4
Types of recommended vaginal topical solutions		
Tea	7	21.2
Cream	4	12.1
Oils	1	3.0
Ointments	5	15.2
Others	3	9.1

Note: Data expressed in numbers and percentages of centers that responded to the variables; n = number of responses from centers.

to pain, difficulty understanding how the dilator therapy works, uncertainty of how and when to use dilators[22]. Psychoeducational interventions on the importance of vaginal dilation for sexuality and performance of vaginal gynecological exams for oncological follow-up, as well as periodical follow-up with health professionals involved in the vaginal stenosis prevention process, such as nurses and/or physiotherapists, are strategies that could be adopted to improve adhesion to the use of dilators[19,21, 23].

Pelvic physiotherapy can help with issues related to pain and muscle dysfunction. Exercises used for rehabilitating the pelvic floor promote improved muscle strength, increased blood circulation to help with tissue restoration, improved elasticity and tissue tension[23]. The systematic review by Brennen et al.[24] identified, in moderate level results, that pelvic floor muscle exercises, guidance, and yoga are favorable for sexual function and quality of life in women survivors of gynecological cancer. The authors emphasized the importance of health professionals' participation in the activities of pelvic floor rehabilitation[23,24]. As this was a cross-sectional study, it was not possible to assess adhesion of patients to vaginal dilators. According to Hanlon et al.[25], a greater adhesion to the use of dilators occurred in women who were motivated by vaginal health and had a lower body mass index. It was also reported that written instructions and free distribution of dilators can improve its use. Educational intervention, as well as providing information and support to women, are important factors that can favor adhesion and use of dilators[25-27].

The importance of this study is due to it being the first to assess the guidance provided in several radiotherapy centers in Brazil on the prevention of vaginal stenosis, being also the first to investigate the recommendation of post-radiotherapy pelvic physiotherapy for gynecological cancer. A limitation is that it was not possible to obtain participation of every center that performs pelvic brachytherapy in Brazil, which may characterize selection bias since perhaps institutions that do not provide information on the prevention of vaginal stenosis after pelvic brachytherapy may have not responded for this reason. The study was designed in a way that SBRT sent the initial invitation to radiotherapy centers in Brazil for reasons of confidentiality in relation to the institutions' email registration in their database. At first, there was a low number of responses to the questionnaire sent to the institution's email; then, the researchers had trouble reaching out to the centers by phone using the data available on the website, due to outdated information and to not having their calls answered even after so many attempts at contact. However, despite low adhesion, there were no interference in the results. The provided responses were adequate and allowed for profiling the institutions. Due to this being an unprecedented study in Brazil, with only one similar study in the international literature (the one from New Zealand[15]), it was not possible to deepen discussion on the findings.

Thus, a panorama with the main guidelines for preventing vaginal stenosis are being conducted by some radiotherapy services in Brazil. This research contributes to enlarge the scarce literature available on the subject, explaining the main measures adopted in the Brazilian territory by participant radiotherapy centers for preventing vaginal stenosis. That way, this study can be the foundation for the elaboration of protocols to be tested in clinical trials, or for guiding clinical conducts in other radiotherapy centers that do not yet enforce measures for preventing vaginal stenosis.

CONCLUSION

Most radiotherapy centers in Brazil that perform brachytherapy and participated in the study provide guidance to patients on preventing vaginal stenosis, with the most enforced measure being the regular and constant use of vaginal dilators. The most frequent recommendation is to start using dilators two weeks after finishing radiotherapy, for over 36 months with no defined limit, three times a week, for 10 to 15 minutes. Stimulating sexual activity with penetration, use of topical solutions, and pelvic physiotherapy are also recommended. The most treated type of gynecological cancer in the participating institutions are cervix, endometrial, and vaginal cancer, and the professionals responsible for providing information on preventing vaginal stenosis are nurses, physiotherapists, gynecologists, and radiotherapists.

CONTRIBUTIONS

All the authors have substantially contributed to the study design, acquisition, analysis and interpretation of the data, wording, and critical review. They approved the final version for publication.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interest to declare.

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