ORIGINAL ARTICLE

Assessment of Radiotherapy induced female sexual morbidity in cancer cervix patients

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ABSTRACT

Introduction: Radiotherapy has several long term side effects in cancer cervix patients involving rectum, urinary bladder, small intestine and bone marrow. Sexual morbidity in these patients is not the priority for treating oncologist and hence usually not discussed This study aims to evaluate the sexual morbidity in cancer cervix patients treated with radiotherapy. **Material and Methods**: All patients who presented in our department with a minimum of 6 month follow up between August 2023 and March 2024 after undergoing radiotherapy for cancer cervix were included in the study. These patients were assessed using EORTC QLQ-C30 questionnaire which is to evaluate overall quality of life and specific symptoms, including sexual health concerns. **Results**: There were 70 patients with a median follow up of 12months. 87.1% patients were sexually active (p=0.01). The most common post radiotherapy complications is vaginal stenosis (85.7%) followed by vaginal dryness (72.8%). The most common complaints of the patients were dyspareunia (85.7%), reduced orgasm (82.8%) and vaginal bleeding (85.7%). 58.5 % patients were distressed with their sex life in comparison to pre radiotherapy period (p value 0.04). **Conclusion**: Sexual dysfunction is a distressing issue among women undergoing radiotherapy for cervical cancer, with substantial impact on their quality of life. Counselling regarding sexual morbidity before treatment and consulting various interventions may alleviate the physical and psychological distress.

KEYWORDS

IMRT, Radiotherapy, Sexual Morbidity, Quality of life

INTRODUCTION

Cervical cancer is one of the most common gynecological malignancy with a 5year survival of 60%for all stages(1).The cervical cancer is treated with multimodality approach which includes combination of surgery, radiotherapy and/or chemotherapy(2).There has been significant advances in the techniques of surgery and radiation which has decreased the incidence of severity of late reactions of rectum, urinary bladder, small intestine and bone marrow.

The increasing survivorship of cervical cancer patients raises the need to address the issues of quality of life. One of the important issue not routinely discussed is regarding the sexual morbidity after the treatment in cancer cervix patients.

Studies define incidence of sexual morbidity due to radiotherapy in cancer cervix patients to range from 30 to 80 %(3,4).The Physical effects include vaginal dryness, fibrosis, stenosis, shortening, bleeding, discharge, urinary and bowel dysfunction. Further there are psychological side effects which include depression, anxiety, fear of sexual pain, distress due to bleeding and altered femineity.

Despite of high incidence of sexual dysfunction in cancer cervix survivors, priority to sexual health problems by oncologist has been of least concern. The common reasons may be the lack of time to counsel the patients or inhibition (5) and difficulty to discuss about sexual issues due to cancer treatment. The purpose of this research is to evaluate the sexual dysfunctions in cancer cervix patients after the treatment.

MATERIAL & METHODS

The present study was conducted in Department of radiation oncology between August 2023 to March 2024.The patients who were treated for cervical cancer and had completed minimum 6 months of follow up after treatment were included in this study.

Data was collected using a validated questionnaire from EORTC (6) (EORTC-CORE30) during personal interview with the patients. The consent was taken from all the participants in written format. The questionnaire

included the subjective questions from the vagina and sexual dysfunctions.

Assessment was also done for the male partner factor - erectile dysfunction that could interfere sexual activity and lead to sexual dysfunction.

Statistical analysis- Pre and post radiotherapy sexual interest as per the results of the questionnaire was compared and p value was calculated using CHI- Square test in Microsoft Excel version.

RESULTS

Seventy patients were interviewed who were treated with either surgery followed by chemoradiation and two intravaginal applications (n=4) or and primary chemoradiation followed by three applications of intracavitary brachytherapy (n=66). The median follow up was 12 months.

Age and stage - The median age was 50 years (range 30 to 66 years). Majority of the patients (n=37,52.85%) belonged to postmenopausal age group. There were 17.1% (n=12) patients in geriatric age group. Out of these twelve geriatric patients, 8 (66.6%) patients were sexually active. In these eight sexually active geriatric survivors, five patients had lower sexual interest and three patients had similar interest.

Majority of patients diagnosed were of FIGO- stage II (47.14%) followed by stage FIGO stage- III (44.2%).

Sexual Activity and Interest - In this study group of 70 patients 61 (87.1%) patients were sexually active on follow up in comparison to 9 (12.8%) patients who became sexually inactive (p=0.01). Among these 61 patients who were sexually active,77.04%(n=47) patients had decreased sexual desire as compared to Pre-Radiotherapy period, whereas 22.9%(n=14)had similar sexual desire after radiotherapy.

Post Radiotherapy Complications - Vaginal problems related to sexual intercourse were reported throughout the period after radiotherapy. The most common complication reportedwas of vaginal stenosis (85.7%) followed by vaginal dryness (72.8%).Occasional foul smelling discharge was also bothersome for significant proportion of patient population (77.1%)

Questionnaire Response related to sexual activity-

Table1:Questionnaire response to the sexual activity

Sexual Dysfunction	% (n)
Dyspareunia	85.7% (60)
Reduced Orgasm (Relaxation after sexual intercourse	82.8% (58)
Irritation around vagina	71.4% (50)
Bleeding	85.7% (60)
Able to complete sexual intercourse	38.5 (27)

The most common complaints of the patients were dyspareunia 85.7%reduced orgasm 82.8% and vaginal bleeding 85.7%. (Table1)

Distressing factors for sexual activity in patients - There were some distressing factors for the patients in conducting sexual activity. These factors were vaginal dryness dyspareunia (85.7%), and bleeding (70%) which had a psychological impact in performing sexual activity.

Satisfaction with sex life-In the present study, 58.5 % patients were distressed with their sex life in comparison to pre radiotherapy period (pvalue-0.04).

Four patients (5.7%) were dissatisfied because their male counterpart did not show interest in sexual activity due to erectile dysfunction.

DISCUSSION

Summary of results: In our study there were70 patients with a median follow up of 12months. 87.1%patients were sexually active (p=0.01). The most common post radiotherapy complications is vaginal stenosis (85.7%) followed by vaginal dryness (72.8%). The most common complaints of the patients were dyspareunia (85.7%), reduced orgasm (82.8%) and vaginal bleeding (85.7%). 58.5 % patients were distressed with their sex life in comparison to pre radiotherapy period (p value 0.04).

Result in context of Published literature

Female sexual health is one of the important indicators of quality-of-life influencing thoughts, feelings, integrations and thus mental and physical health. It is an under researched area in gynecologic oncology. It is important to understand that the status of sex life of a female is linked to both physical and psychological satisfaction.

Issues of sexual activity in post gynaecological cancer treatment are important to consider as 40% – 100% (7)of gynaecological cancer patients will experience some sort of sexual complaints after treatment. Most common sexual dysfunctions after treatment are orgasmic difficulties, vaginal stenosis, dyspareunia, lymphedema and genital numbness.

Age and stage

Women becomes sexually activeduring adolescence period and reach their peak orgasmic frequency intheir third decade.They may have a constant level of sexual capacity up to 5thor 6th decade of life(8). It is a myth that sexual issues are of less importance in older women and therefore, in general, it is seen that the oncologists are less considerate about these issues while treating the cancer patients of older age.

Trompeter et al (9)report a study of sexual activity and satisfaction in healthy community involving older women from the Rancho Barnado study (RBS cohort). Age was analysed by quartile based on 806 respondents with 201 and 202 women in each quartile. Fourth quartile consisted of 79.2years or more among which 23.1 % reported sexual arousal, 26.8 % reported lubrication, 37.5% reported reaching orgasm and 41.7 % were very satisfied with ability to reach orgasm almost always. The author concluded that half of the women were sexually active with arousal, lubrication and orgasm maintained into old age.

A study by Lonnèe-Hoffmann et al (10) of 230 patients in late menopause with mean age of 70 years was done about the sexual function. Seventy four percent of the patients were sexually active in early post menopause as compared to 56 % of women in late menopause. The unavailability of partner was most common factor for decrease in sexual interest.

In the previous two studies discussed which have patient population of different countries (California(9) and Australia(10)) shows that sexual activity / interest / satisfaction is an important concern for all age groups,

not under-estimating the older women too. In the present study, 12 (17.14%) patients were above 60 years of age among which 66.6%(n=8) were sexually active.

In a Canadian study by Conway et al (11) of sixty patients, sexual adjustment questionnaire (SAQ) was used before treatment and during follow up. Inverse correlations were found between total SAQ score and FIGO stages (≥IIB) (p-0.005) as mean vaginal $D_{2cm3}$and mean vaginal dose was more (100.3 and 68.2 Gy versus 120 and 78.4 Gy respectively) in comparison to FIGO stage IB-IIA, indicating worse sexual adjustment in advanced stages.

Another study of Brazil by Corriera et al (12) of 46 women was done to assess the sexual function of cervical cancer treatment. The results revealed that the type of treatment (p=0.03), type of radiotherapy (p=0.01) and the stage (p=0.02) of the disease interfered with the sexual function. The sexual clinical variables were worse in terms of lubrication (p=0.03) and pain (p=0.04) in patients treated with combined modality (surgical plus adjuvant chemotherapy or radiotherapy)

In our study, most of the patients were of early stage (71.4%).There were only 4 patients who underwent multimodality treatment of surgery followed by chemoradiotherapy. No significant correlation was observed between the stage and sexual dysfunction. The probable reason may be that all patients were treated with standard protocol of chemoradiation followed by 3 fractions of intracavitary radiotherapy, or postoperative chemoradiotherapy followed by 2 fractions of intravaginal brachytherapy. None of the patient underwent surgery alone, so radiotherapy morbidity could not be prevented.

A French study by Le Brogne et al (13)·conducted around a decade before, was on the quality of life in long term cervical cancer survivors. In a study population of 173 cancer cervix survivors 42% were treated by surgery alone and 58% were treated with combination of surgery and chemoradiotherapy. The patients treated with adjuvant chemoradiotherapy had worse quality of life than those treated with surgery alone. The common complaints were sexual worry and dysfunction, abdominal and voiding impairment and lymphedema. In FIGO cancer report 2021,Bhatla et al (14) emphasis on single modality treatment surgery or radiotherapy or chemoradiotherapy rather than surgery followed by adjuvant chemoradiotherapy, the treatment decision should be based on clinical anatomical and social factors and avoiding multimodality treatment they may lessen the treatment related morbidity.

Female Sexual Interest and distress: Cervical cancer patients undergo physical and psychological problems which may lead to sexual dysfunctions. The physical discomfort due to the symptoms before treatment (foul smelling discharge and bleeding per vagina) after treatment (dyspareunia due to vaginal dryness and stenosis). The psychological trauma is seen before treatment (diagnosis of malignancy), during machine fear and radiotherapy intervention) and post treatment due to depression (fear of recurrence and decrease in quality of life).

A Scottish study[(15)]was conducted around three decades before, on psychological and sexual outcomes of treatment on 83 women of early stage cervical cancer. It revealed that 91% of patients had fear of recurrence and 39% of patients blamed themselves for the present condition. Radiotherapy treated patients commonly reported dyspareunia and loss of enjoyment. These psychological as well as physical problems more were highly corelated with sexual outcomes (p<0.01).

A Swedish study by Bregmark et al (4)in previous millennium regarding vaginal changes in patients of early stage cervical cancer reported higher morbidity in cancer patients than control group in terms of short vagina (26% vs 3%), insufficient elastic vagina (26%vs 4%) and moderate or much distress due to vaginal changes (26 % vs 8%).

Another study from MD Anderson cancer Centre (16) was conducted for assessing quality of life and sexual functioning in cancer cervix survivors who had completed at least 5 years after initial treatment. One hundred and fourteen patients (37 surgery, 37 radiotherapy and 40 controls) were interviewed and the scores on FSFI (Female sexual fertility Index) did not reveal any difference in sexual desire however the patients who underwent radiotherapy had more difficulty in becoming sexually aroused attaining vaginal lubrication reaching orgasm and achieving sexual satisfaction along with more dyspareunia complaints.

Another study from Denmark by Jensen et al (3) on 118 patients for sexual function and vaginal changes due radiotherapy in cervical cancer shows that approximately 85% patients had low or no sexual interest, 35 % had moderate or severe lack of lubrication, 55% had dyspareunia and 35 % were dissatisfied with their sexual life. The authors reveal an interesting fact that despite physical and psychological distressing factors, 63% of patients continued to be sexually active after treatment although, with a considerably decreased frequency. This report emphasizes that there is a persistence of sexual desire in post treated cancer patients and therefore the problem of sexual morbidity should not be undermined and should have due importance in the counselling.

These physical and psychological distress can be alleviated by different maneuvers. One of the suggestions may be to engage in sexual intercourse frequently after completion of radiotherapy in an effort to prevent the adhesions of vaginal mucosa and vaginal stenosis and elasticity. Further, vaginal stenosis can be counteracted by using vaginal dilators or vibrators and vaginal dryness by moisturizers and lubricants.

In our study post radiotherapy complications seen were vaginal stenosis (85.7%) and vaginal dryness (72.8%) Occasional foul smelling discharge was also bothersome for majority of patient (77.1%). High incidence of vaginal dryness and vaginal stenosis may be attributed to post radiotherapy complications. Further, high incidence of foulsmelling discharge may be due to improper practices to maintain genital hygiene prevalent in our society leading to increased incidence of bacterial vaginosis(17).

Simple strategies should be implemented into daily clinical practice by discussing and counselling the patients.

Female orgasmic dysfunction: Orgasm is essential for healthy sexual life offering a unique blend of physical pleasure, emotional intimacy, and overall well being. They serve as natural release of tension, promoting

relaxation reducing stress. Rarely any discussion is seen in literature regarding female orgasmic dysfunction in cancer cervix patients.

During orgasm, the pelvic floor muscles contract rhythmically in unison(18) about 7-13 contractions occurred over a span of about 5-14 seconds (19). The contractions often are associated with the sexual pleasure, during which there may be and enlargement of clitoris, as well as contraction of pelvic muscle(20).

Not able to achieve orgasm after radiotherapy was one of the most common complaints (82.8%) of our patients. The probable pathophysiology could be that radiotherapy results in muscle injury leading to myopathy and interference in the pelvic contractions resulting in orgasm difficulties.

A pilot study of ten patients to assess the dose of radiation to the pelvic muscles in patients of carcinoma cervix treated by Intensity modulated radiotherapy was done in our institute, The unpublished results revealed that very high doses were received by various pelvic muscles- gluteus muscle(Dmean 40 Gy,), levator ani-(Dmean 54.96 Gy),pyriformis (Dmean 54.99 Gy,) ,obturator internus (Dmean 48.56Gy), iiliopsoas(Dmean 55.38 Gy). These high doses to pelvic muscles may lead to muscle myopathy.

Another study done in our institute on neck muscles, analogue to pelvic muscles (21) was published as an abstract in European journal of radiation oncology. Among forty patients, 50% (n=20) developed clinical signs and symptoms of myopathy. The most common symptom was pain (60%) and stiffness (60%), followed by rigidity (40%) and difficulty in neck movements (20%). The highest mean doses were received by Sternocleidomastoid, scalene muscles receiving 70Gy & 68Gy respectively. Percentage of muscle volume receiving 30Gy (V30) for various neck muscles were trapezius (31%), SCM (91%), scalene (93%),capitus(56%) and levator scapulae (73%). The neck muscle dysfunctions seen in post chemoradiotherapy period were shrugging of shoulder (50%, $p<0.05$), head tilt test and rotation of head (40%, $p< 0.05$); flexion and extension of head (10%). Overhead abduction of arm was not compromised in any of the patients. The most common grade of neck muscle weakness was grade I and none of the patients had grade III weakness. The median latency period of developing these symptoms was 2.5 to 3 months. These two studies conducted in our institute may arise a hypothesis that pelvic muscle dysfunction may lead to orgasmic difficulties in cancer cervix patients where doses to pelvic muscle have not been evaluated.

The international society for sexual medicine recommends a combined cognitive and behavioural approach to treat female orgasmic disorder by a technique, directed masturbation that involves graded genital stimulation. The committee reports success rate as high as 90 %and are best when coupled with cognitive behavioural therapy (22). The patients of cancer cervix having orgasmic difficulties may be counselled by experts for directed masturbation in follow up.

Further pelvic floor physiotherapy may be useful to counteract the orgasmic dysfunction. It comprises of intravaginal trigger point and massage techniques with a goal to enhance the flexibility of paravaginal tissue, and strengthen the pelvic girdle muscles.

Communication Interest of partner- In a study by Cull et al(15) 63 % of 63 women with partners reported that their partner had never attended a clinic visit with them and neither had talked with their doctor though the men offered medical help (72%).Forty four percent felt they could not communicate with their partner adequately about their feelings and relation to cervical cancer. This communication gap with the partner may lead to dissatisfaction in their sexual relationship.

In another study by Grimmel et al(23)the main reason for sexual inactivity was that women did not have a partner or were not interested in sexual activity.

Role of Counselling: Sexual dysfunction should be an important concern for oncologists and patient should be counselled before the treatment and in follow up. In a study by Cull et al (15) 49% patients would have like to have counselling. The majority felt that they needed more information about the disease its treatment and rehabilitation.

Zhou et al (24) in his study mentions that, due to traditional culture, cervical cancer survivors in China usually avoid discussing issues regarding sexuality. This issue may be prevalent in most of the countries. On the contrary study by Vincet et al (25) almost half a century ago, marital sexual concomitants reports that 80 % of patients treated with cervical cancer wished for information on sexual issues from their physician and 56 % of these did not feel sufficiently informed.

Gott et al (26)in his study mentions that there are time constraints for communication and counselling for both general practitioner and practice nurse There is only limited time available for general consultation and discussion of sex health is described as ‘can of worms’ or pandoras of box. This time constraint barrier can be overcome if dedicated trained clinical psychologist forms the part of treating team managing the cancer cervix patient.

The treating physicians are more concern about treating of cancer and have lesser interest in discussing the sexual issues of the patient. Adequate education and good communication about sexual activities is important and cannot be underestimated in the treatment plan of cancer cervix patients and should be practiced as regular part of counselling.

Most of the studies have used Female Sexual Fertility Index Score (27) for detecting sexual morbidity in cancer survivors. This 19 point questionnaire has been framed which deals with very detailed sexual practice of their intimate relationship on sexual desire, arousal, interest, orgasm, lubrication, vaginal penetration and sexual satisfaction. Our study involves most of the patients from lower socioeconomic status with less literacy, and discussion on sexual issues makes them uncomfortable and embarrassed. Still we tried to raise up questions from EORTC Core-30(6) questionnaire, reason being it is less detailed and it is our first attempt in our institution to discuss about such topic.

Strength and Weakness- We couldn’t use the FSFI score as most of the patients were from low socio economic status with less literacy and discussion on sexual issue makes them uncomfortable and embarrassed. The

strength of the study lies that we tried to overcome this inhibition on sexual dysfunction by using less detailed EORTC Q30 which is the first attempt in our institute.

Implications and Future Research: The counselling of sexual morbidity to be incorporated during treatment discussion. Patient should be made aware regarding sexual morbidity and how it could be reduced by vaginal intervention as discussed in the manuscript.

The future research should be focused on reducing the dose to vagina by using advance radiation technologies.

CONCLUSION

Sexual dysfunction is a distressing issue among women undergoing radiotherapy for cervical cancer, with substantial impact on their quality of life. Counselling regarding sexual morbidity before treatment and consulting various interventions may alleviate the physical and psychological distress.

AUTHORS CONTRIBUTION

All authors have contributed equally.

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CONFLICT OF INTEREST

There are no conflicts of interest.

DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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