International Journal of Medical Reviews and Case Reports

IJMRCR
2534-9821 (Online)

Homepage

Publisher: Bulgarian Association of Young Surgeons

Society/Institution: Bulgarian Association of Young Surgeons

Country of publisher: Bulgaria

Date added to DOAJ: 28 Aug 2018

Record Last Updated: 28 Aug 2018

LCC Subject Category: Medicine

Publisher's keywords: medicine

Language of fulltext: English, Portuguese

Full-text formats available: PDF, HTML, XML

International Journal of Medical Reviews and Case Reports

International Journal of Medical Reviews and Case Reports.

English title:	International Journal of Medical Reviews and Case Reports
ISSN:	2534-9821
GICID:	*n/d*
DOI:	10.5455/IJMRCR.Enhancing-Skin-Brightness
Website:	http://mdpub.net/index.php
Publisher:	Bulgarian Associationa of Young Surgeons
Country:	BG
Language of publication:	PT EN IT FR TR ES

Deposited publications: 52 › Full text: 100% | Abstract: 100% | Keywords: 99% | References: 100%

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Non-indexed in the ICI Journals Master List 2019

Not reported for evaluation — Archival ratings

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Citations — Reports 2010-2019

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Included auto-citations - n/d

Journal description | Details | Scientific profile | Editorial office | Publisher

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MSHE points 2019: n/d

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International Journal of Medical Reviews and Case Reports (Int J Med Rev Case Rep)

ISSN: 2534-9821

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Pain Characteristics of Cervical Cancer Patient Who Underwent Radiotherapy in Bali, Indonesia

Vania Sukarno, I Putu Eka Widyadharma, Ida Ayu Sri Wijayanti, Kumara Tini, Ngakan Putu Daksa Ganapati.

ABSTRACT

Abstract

Introduction: Treatment of cervical cancer with radiotherapy is very common in Indonesia. Whenever radiotherapy is performed, not only tumor cells, but all the cells around it received damage therefore causes pain and discomfort to the patient. Often, this phenomenon is overlooked by both patients and medical practitioners. Aims: Author aims to describe pain characteristics of cervical cancer patient treated with Cobalt-60 radiotherapy in Sanglah hospital, based on patient's age, cancer stadium, education level, marital status, mean income per month, duration of pain, pain intensity, type of pain

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PAIN CHARACTERISTICS OF CERVICAL CANCER PATIENT WHO UNDERWENT RADIOTHERAPY IN BALI, INDONESIA

Vania Sukarno[*], **I Putu Eka Widyadharma**[**,1], **Ida Ayu Sri Wijayanti**[**], **Kumara Tini**[**] **and Ngakan Putu Daksa Ganapati**[△]
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ABSTRACT Introduction: Treatment of cervical cancer with radiotherapy is very common in Indonesia. Whenever radiotherapy is performed, not only tumor cells but all the cells around it received damage. Therefore, it causes pain and discomfort to the patient. Often, this phenomenon is overlooked by both patients and medical practitioners. Aims: The author aims to describe the pain characteristics of cervical cancer patients treated with Cobalt-60 radiotherapy in Sanglah hospital. **Method:** This is a retrospective, descriptive cross-sectional study. The sampling method used is an accidental sampling. Data is collected using questionnaire form, entered into SPSS ver.21 and the result is analyzed. **Results:** Sample characteristics are cancer stadium II and III, age 50-59 years old, received primary school education, married, no income/unemployed, and experienced pain during therapy. Most patients describe the pain as acute, onset post-radiotherapy, moderate intensity, located on pelvic anterior, not radiating, pain attacks without pain between them, and nociceptive pain. Most patients who experienced pain do not consume analgesic drugs and no breakthrough pain.

KEYWORDS Cervical cancer, Radiotherapy, Pain, Characteristics

Introduction

In 2012, the World Health Organization declared 20.928 new cases of cervical cancer in Indonesia [1]. Breast and cervical cancer is the highest prevalence of cancer in Indonesia [2]. Indonesia is classified as Lower-Middle Income Country (L-MIC) therefore Cobalt 60 machines still contribute to 48% of all radiation machines provided to treat cancer within the country with only 31% of needs for radiation machine is currently covered.[3] Instead of tumor cells, radiotherapy also injures normal cells around it; therefore, it triggers an immune response and activates the chemical and mechanic chain reaction that results in pain [4,5]. On the other hand, pain caused by radiotherapy is not adequately treated because it is underreported and not well described.

International Association for the Study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Neuron fibre such as myelinated Aδ fibre and unmyelinated C fibre that are responsible for the transmission of the pain impulse [6]. Professional medical workers assume that pain could be gradually reduced as the cancer is controlled, therefore focusing much more upon the management of cancer itself, while the side effects such as pain are compromised. Pain could cause what supposed to be avoidable distress, decreasing body functions, disturb sleeping and eating pattern, decrease life quality in spiritual and psychological aspects, and possibly results in turning down new treatments that possibly cure cancer because it causes unavoidable pain side effect [7]. Pain perception on every individual varies; thus, objective pain assessment is very important for a clinician to provide adequate and effective pain management [8].

A large number of patients are at risk of pain and rapidly growing concern about this side effect. As far as the author

DOI:10.5455/IJMRCR.Cervical-Cancer-radiotherapy-bali
First Received: January 12, 2020
Accepted: February 03, 2020
Manuscript Associate Editor: Ivan Inkov (BG)

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Table 1 Sample characteristics of cervical cancer patients who underwent radiotherapy.

Variable		Frequency	Proportion (%)
Age	30-39	10	20
	40-49	16	32
	50-59	22	44
	60-69	2	4
Cancer Stage	I	7	14
	II	21	42
	III	21	42
	IV	1	2
Education Level	No Formal Education	4	8
	Primary School	15	30
	Junior High School	9	18
	Senior High School	11	22
	University Graduate	5	10
	Non-Degree Diploma Qualifications	6	12
Marital Status	Single	1	2
	Married	45	90
	Widowed	4	8
Monthly Income	0	25	50
	<2000000	7	14
	>2000000	18	36
Experienced Pain	Yes	42	84
	No	8	16

acknowledged, there has been no data on pain characteristics of cervical cancer patients undergoing radiotherapy before. The author asses characteristics of patients such as patient's age, cancer stadium, education level, marital status, mean income per month, duration of pain, pain intensity, type of pain, radiating pain, pain location pain behavior pattern, analgesic drugs consumed and breakthrough pain.

Material and Methods

This retrospective, descriptive cross-sectional study is conducted at 'Sanglah Hospital' a tertiary care multispeciality hospital located in Denpasar city, Bali, Indonesia. The accidental sampling method is used because patients visit on a different schedule. Ethical Commission of Medical Faculty at Udayana University, Bali has approved this study. Details relating to individual participants included in the manuscript have received all participants' consent.

A total of 50 women diagnosed with cervical cancer between age 30-67 years underwent radiotherapy for curative or definitive therapy. External beam radiation therapy (EBRT) Anterior-Posterior (AP-PA) + booster box system with Cobalt-60 is performed to all patients. Field size is bordered as following; the superior border between L4 and L5, the inferior border just below obturator foramen, lateral borders are 2 cm from the pelvic brim. This hospital does not perform brachytherapy because there is no device provided for that despite the guideline for cervical cancer definitive therapy. Patients receive EBRT Anterior-Posterior (AP-PA) 25 fractions of 2Gy added with booster box system 5-8 fractions of 2Gy to substitute for brachytherapy to all patients. Patients in this study receive a total dose of 60-66 Gy.

Patients are studied during these five months. Patients' demography data varies, and their description of pain also varies. A questionnaire is specially prepared for the collection of data on the following aspects: age, cancer stadium, education level, marital status, and mean income per month. The interval from

Table 2 Characteristics of cervical cancer patients who underwent radiotherapy that experienced pain.

Variable		Pain		P-value*
		+	-	
Age	30-39	9(90.0%)	1(10.0%)	0.53
	40-49	14(87.5%)	2(12.5%)	
	50-59	18(81.8%)	4(18.2%)	
	60-69	1(50%)	1(50%)	
Cancer Stage	I	7(100.0%)	0(0.0%)	0.47
	II	16(76.2%)	5(23.8%)	
	III	18(85.7%)	3(14.3%)	
	IV	1(100.0%)	0(0.0%)	
Education Level	No Formal education	4(100.0%)	0(0.0%)	0.35
	Primary School	10(66.7%)	5(33.3%)	
	Junior High School	8(88.8%)	1(11.1%)	
	Senior High School	10(90.9%)	1(9.1%)	
	University Graduate	5(100.0%)	0(0.0%)	
	Non-Degree Diploma Qualification	5(83.3%)	1(16.7%)	
Marital Status	Single	1(100.0%)	0(0.0%)	0.59
	Married	37(82.2%)	8(17.8%)	
	Widowed	4(100.0%)	0(0.0%)	
Monthly Income	0	22(88%)	3(12%)	0.57
	<2000000	5(71.4%)	2(28.6%)	
	>2000000	15(83.3%)	3(16.7%)	

*p-value obtained in Chi-square test using SPSS version 21 analysis.

radiation therapy to the questionnaire survey varies between 3 days to 30 days.

The duration of pain was defined as acute (less or equal to 3 months) or chronic (more than three months), pain intensity is measured with NPRS with the classification of No Pain (0), Mild (1-3), Moderate (4-6), Severe (7-10), type of pain is classified based on nociceptive, neuropathic positive symptoms, negative neuropathic symptoms, or combination pain, whether patient experience radiating pain, pain location with the classification of pelvic anterior, pelvic posterior, pelvic anterior and posterior, and outside of pelvic, pain behavior pattern as in painDETECT questionnaire, analgesic drugs consumed with the classification of paracetamol, Nonsteroidal Anti-inflammatory Drug (NSAID), Morfin, morfin+paracetamol, NSAID+paracetamol and weather patient experienced breakthrough pain after consuming analgesic drugs. The collected data were tabulated, and the results were interpreted. SPSS version 21 was used to process all statistical analysis, including the chi-square test provided in table 2.

Results and Discussion

The sample characteristics in this study mostly have age category of 50-59 years old (44%) and mean of 47.6 years old, mostly came with cancer stage II and III (both 42%), received only primary school education (30%), married (90%), no income (50%), and 84% experienced pain. This study and those conducted in Thailand and Uganda have similar patient characteristics [9,10]. On the other hand, a study in England, provide different samples where the cancer stage is lower (stage IA 37.5% and stage IB 35.1%) and has younger patients group (30-39 years old) [11]. Sheppard, et al., who conducted a study in the United States of America found different patient characteristics such as most are not married (45.1%) and only 5.2% are unemployed [12]. Cervical cancer is a preventable disease with a higher prevalence and mortality rate in countries with lower resources. In developing countries, the screening program designed for citizens are not equally distributed throughout the country and not as efficient. Not many health facilities could provide treatment, and lack of medical workers' competency are the reasons behind the difference in sample demography between high and low resource countries.

The proportion of younger patients complained about pain is larger than older patients. This is supported by Molton et al. who confirmed that older people (a group with mean age 65 years) usually apply a variety of strategies to cope with pain compared to younger people (a group with mean age 31 years and 50 years) [13]. These strategies result in a lower pain per-

Table 3 Pain characteristics of cervical cancer patients who underwent radiotherapy.

Pain Characteristic		Frequency	Proportion (%)
Onset	Pre-Radiotherapy	19	45.2
	Post-Radiotherapy	23	54.8
Duration	Acute	26	61.9
	Chronic	16	38.1
Intensity	Mild	10	23.8
	Moderate	20	47.6
	Severe	12	28.6
Location	Anterior Pelvic	19	45.2
	Posterior Pelvic	9	21.4
	Anterior and Posterior pelvic	12	28.6
	Outside Pelvic	2	4.8
Radiating	Yes	13	31.0
	No	29	69.0
Pain Behavior Pattern	Persistent pain with slight fluctuations	6	14.3
	Persistent pain with pain attacks	7	16.7
	Pain attacks with pain between them	29	69.0
Type	Nociceptive	24	57.1
	Neuropahic Positive Symptoms	1	2.4
	Mixed	17	40.5
Analgesic Drugs Consumption	Not consuming analgesic drug	21	50.0
	Paracetamol	15	35.7
	NSAID*	4	9.5
	Morphin + Paracetamol	1	2.4
	NSAID* + Paracetamol	1	2.4
Breakthrough Pain	Yes	4	23.5
	No	38	76.5

*NSAID = Nonsteroidal Anti-inflammatory Drug.

spective.

This study shows no difference in the proportion of pain experienced by patients who only received primary school education from those who have graduated from university. On the other hand, Antony and Merghani noted that higher education would rise higher concern on pain [14]. Koppen et al. elaborate on how low health literacy is related to higher pain intensity but fail to correlate formal education and health literacy [15]. The majority of widowed and single patients have higher pain proportion (100%), compared to married patients (82.2%). According to James B et al., married individuals received higher emotional support, thus lower reaction to pain, while widowed women have a higher probability of complaining about pain [16]. Meanwhile, Cano et al., emphasize on the contentment of marriage itself upon pain perspective, as unhappy marriage leads to increased patient's pain intensity [17].

The pain proportion of patients who do not have any income is higher than patients who have income. Most probably, it is caused by more sophisticated and easier access to pain management than patients with higher monthly income could afford. On the other hand, Antony and Merghani conclude that increasing income equals to bigger concern towards self-health care, therefore, increasing sensitivity to pain stimulus [14]. The majority of patients complain about the pain after radiation treatment (54.8%). In Sanglah hospital, chemotherapy is performed before the radiation therapy and not concurrently. After a patient is diagnosed with cervical cancer, she will be referred to chemotherapy first while her name is registered on the waiting list for radiation therapy. Most cervical cancer patients were administered with cisplatin for chemotherapy. After completing the chemotherapy regiments, she has to wait for her radiation therapy to start. This happened because this hospital only has one radiation machine. Therefore patients have to wait for their turn. On table 3, pain onset before radiotherapy indicate pain caused by surgery or chemotherapy, but pain after radiotherapy indicate that it is mainly caused by radiotherapy. A different result is proclaimed by Dahiya et al. upon cervical cancer in India, where more patients complained about pain before therapy (42.1%) rather than post-radiotherapy (20.5%) [18].

Innovation and development of radiation therapy over the past decade have resulted in a more precise radiation dose distribution to the shape of the tumor, thus allowing minimized dose to normal tissues and other organs at risk. Moreover, this development allows higher dose delivery called "dose-painting" to areas with greater tumor cells [19]. Cobalt-60 radiotherapy machine, which is used in this study, has been replaced by more advanced technologies such as linear accelerators in higher resourced countries. Edges of beams linear accelerator are much more sharply defined than those of a cobalt machine, allowing additional precision in dose delivery, according to Reddy K.S [20]. The side effect of pain is more common after radiotherapy with cobalt-60 rather than a linear accelerator. However, this study represents lower resource countries that still widely use cobalt 60 machines.

Acute pain is experienced by most of the patients (61.9%). The method of this study may be the cause. The accidental sampling method may cause a time gap between the start of therapy and collecting questionnaire varies between each patient.

Moderate pain intensity (47.6%) is commonly suffered by patients. Pain intensity in this study is higher than a study by Larue, et al., where the pain intensity of unmetastasized cancer and metastasized cancer, according to NPRS is 3.22 and 4.83 respectively [21]. Although moderate pain intensity is found, only 50% of patients who suffer are consuming analgesic drugs, and the most common drug used is paracetamol (acetaminophen) which accounts for up to 35.7%. According to WHO guidelines on pain management with ladder illustration, moderate and severe pain (step 2) should be administered with non-opioid analgesics added with an opioid analgesic such as hydrocodone mixed with acetaminophen with adjuvants such as antidepressants or anticonvulsant as needed. If patients' complain do not subside, step 3 is the same regimen as step 2, but replaced what was mixed opioid with pure opioid and add or continue adjuvant drugs [22]. In this study, the analgesic drugs administered are not adequate. This could be caused by a lack of patient's awareness to mention the pain felt to medical workers during the consultation, and also caused by medical workers who have not properly asses pain.Moreover, pain assessment should be included in every consultation session as it is now a part of the vital sign.

Breakthrough pain is diagnosed using alogarithm that was mentioned in the Journal of the National Comprehensive Cancer Network [23]. This study found that 23.5% of patients who consume analgesic drugs experienced breakthrough pain. Breakthrough pain could be triggered by heavy physical activity or autonomic movements such as peristaltic, inadequate pain management, or end-of-dose failure. Sometimes the cause of breakthrough pain cannot be fully understood. Author suspect that breakthrough pain is the result of inadequate pain management in this study.

The location of pain found the most is pelvic anterior (45.2%) followed by a combination of pelvic anterior and posterior (28.6%). This result is similar to Das, Jeba, and George, who mentioned 15 out of 46 (32.6%) patients felt pain in pelvic anterior (lower abdomen and suprapubic). In contrast, the same proportion felt pain in pelvic posterior (gluteus, sacrum, and rectum) [24]. Cobalt-60 has a linear radiation beam that is usually shot from anterior pelvic towards posterior pelvic to treat cervical cancer. Therefore the anterior part receives a larger impact, but both locations are susceptible to pain.

Mixed pain is described by 42.9% out of all the patients who experienced pain. Neuropathic pain is related to injured neuron fibre, which causes pain to radiate throughout dermatome. This study shows that 31% of patients complain about radiating pain. Nociceptive pain is the most common pain described as dull, heavy, aching pain (57.1%), which means that pain came from normal cell injury that triggers chemical and mechanic cascade, which stimulate nociceptor.

Pain behavior pattern is related to the type of pain for the first time by Freynhagen, et al, which noted that most of the patients with neuropathic pain describe pain behavior pattern as pain attacks without pain between them [25]. This study applies the same pain behavior pattern to the mostly nociceptive type patients, but 69% of the patients also complain about pain attacks without pain in between.

Conclusion

Sample characteristics could represent a study conducted in a low resource country. Most patients treated with radiotherapy in this study experienced pain. The majority of pain is nociceptive type, which appears after the radiation therapy is given. The pain felt was at moderate intensity but not adequately managed, therefore, may cause breakthrough pain. The majority of patients complain of pain on anterior pelvic while few other patients also

felt posterior pelvic pain, showing a linear pattern where the radiation beam is shot.

Authors' contributions

1. Vania Sukarno Contributions: Conception and design, data analysis and interpretation, drafting the article, final approval of the version published, agreed to be accountable for this study.
2. I Putu Eka Widyadharma Contributions: Design, criticize intellectual content, final approval of the version published, agreed to be accountable for this study.
3. Ida Ayu Sri Wijayanti Contributions: Design, criticize intellectual content, final approval of the version published, agreed to be accountable for this study.
4. Kumara Tini Contributions: Design, criticize intellectual content, final approval of the version published, agreed to be accountable for this study.
5. Ngakan Putu Daksa Ganapati Contributions: Criticise intellectual content, final approval of the version published, agreed to be accountable for this study.

Acknowledgement

Authors acknowledge dr.Ketut Ayu, chairperson of Radiotherapy Department for general support she provided for this study.

Conflict of interest

The authors declare no conflict of interest.

Patient informed consent

Details relating to individual participants included in the manuscript have received all participants' consent.

Funding

There were no financial support from any organization that could pose any conflict of interest.

Ethics committee approval

Ethical Commission of Medical Faculty in Udayana University, Bali has approved this study.

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