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Review article

The experiences of women receiving brachytherapy for cervical cancer: A systematic literature review

P. Humphrey [a, *], C. Bennett [b], F. Cramp [b]

[a] Bristol Cancer Institute, Bristol Haematology and Oncology Centre, Horfield Road, Bristol, BS2 8ED, UK
[b] Faculty of Health and Applied Sciences, Glenside Campus, University of the West of England, Blackberry Hill, Bristol, BS16 1DD, UK

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ABSTRACT

Objectives: To determine women's experiences of brachytherapy for cervical cancer.
Key findings: Nineteen studies were included for data extraction/synthesis. Twelve studies focussed on psychological issues, seven on pharmacological aspects of women's experiences. Themes of anxiety, distress, pain, informational needs and non-pharmacological interventions were found. Nine out of ten psychological studies described brachytherapy as a distressing experience causing anxiety and distress for most women. Non-pharmacological interventions were found to be effective and inexpensive adjuncts. Peri and post-operative pharmacological management was variable, but duration of procedure was an important factor.
Conclusion: Brachytherapy for gynaecological cancer causes varying levels of pain, anxiety and distress. To improve women's experiences there needs to be better pain management, patient information and the development of non-pharmacological interventions. Future recommendations are to develop clinical support guidelines, audit the quality of services and develop effective interventions to improve women's experiences of brachytherapy for locally advanced cervical cancer.

Introduction

The worldwide incidence of cervical cancer has been estimated as 528,000 newly diagnosed cases annually and is the 4th most common cancer in women.[1] Global incidence is highest in less developed countries (85%) with higher mortality rates where there is less access to diagnostic and therapeutic health services.[1] Approximately 3000 new cases of cervical cancer are diagnosed each year in the UK.[2] Despite a comprehensive national cervical screening programme, about a third of these women present with locally advanced disease, unsuitable for surgery. For about 1000 women per year chemotherapy and radiotherapy including brachytherapy is standard treatment in the UK. Brachytherapy is a type of internal radiation therapy where a radioactive source is placed close to the tumour. To deliver the radiation dose to treat locally advanced cervix cancer, hollow applicators are placed in the uterus and vagina and the radioactive source is passed into the hollow applicators. This technique is currently offered at 42 UK radiotherapy centres.[3]

In the past treatment machines used low dose rate (LDR) radioactive sources with treatment times typically 2–3 days. Treatment was delivered in a shielded radiation room on a ward. Patients were immobilised and in isolation to prevent irradiation of hospital staff. The radiation could be switched off for short periods to allow nursing care, medication delivery and food and drink supplies. However any break in treatment was minimised to keep overall time as short as possible. Visitors were kept to a minimum or prohibited. This was the most common type of brachytherapy in the UK until the early 2000s. Due to lack of availability of replacements for the LDR afterloader caesium sources most UK departments purchased a high dose rate (HDR) afterloader so the treatment could be delivered in minutes.[3] The newer HDR system requires multiple fractions (typically 3–5) to give the equivalent radiobiological effect as LDR treatment.

Recent technical developments include brachytherapy applicators compatible with Computerised Tomography (CT) and Magnetic Resonance Imaging (MRI) to enable acquisition of CT and MRI scans with applicators inside patients. Previously treatment planning was 2-dimensional and dose prescribed to a defined point. However

* Corresponding author.
E-mail addresses: Pauline.humphrey@uhbristol.nhs.uk (P. Humphrey), Claire7.bennett@uwe.ac.uk (C. Bennett), Fiona.cramp@uwe.ac.uk (F. Cramp).

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with new treatment planning software 3-dimensional CT and MR images are used to prescribe dose to a volume. With improved imaging and planning it is possible to minimise dose to structures that are sensitive to radiation, known as organs at risk (OARs). Excessive radiation dose to OARs would cause acute and long term side effects. The introduction of extra needle applicators into the cervix tumour has allowed dose escalation which has been shown to increase local tumour control to 85–100%.[4–8] As the planning has become more complex, with the requirement to draw the tumour (target volume) and OARs onto the 3D images, so the time taken to plan treatments has increased. Anecdotally it is reported that planning time has increased from a matter of minutes to two to five hours.

Some centres give HDR brachytherapy as a day case procedure.[9,10] Patients arrive early in the morning for anaesthetic and theatre procedure for applicator/needle insertion, then CT and/or MR imaging, planning, treatment delivery, applicator removal and discharged home later the same day. Some centres keep patients in hospital overnight with applicators/needles remaining in place and repeat treatments over two to three days.[11] Although the patient does not need to remain in isolation in a radiation treatment room like the old LDR treatments, it does mean they have to remain immobile in bed for a long time. However, their treatment may be completed in one hospital visit and only require one theatre and anaesthetic procedure. Some centres do two treatments for one theatre procedure with one overnight stay, then repeated a week later.[12] Some centres deliver the radiation in pulses, using a source typically 1/10th the activity of a HDR source which is pulsed hourly (Pulsed dose rate, PDR). This is usually given in an isolation room on a ward. The introduction of interstitial needles may have led to the potential for greater pain for women, and some centres have altered their anaesthesia and analgesia techniques to help women cope with this.[10]

There are some benefits and disadvantages for these different methods of dose delivery but the impact of these technical and scheduling changes on patients is unknown. A systematic literature review (SLR) was carried out with the aim to determine women's experiences of brachytherapy for cervical cancer so that consideration could be given to patient's needs.

Methods

The SLR was carried out following PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses),[13] registered on PROSPERO International prospective register of systematic reviews, and completed in May 2017.[14]

A systematic literature search was carried out independently by two researchers. Five databases: MEDLINE; CINAHL; EMBASE; PsychINFO and AMED were selected to ensure journals would be included that were authored and read by oncologists, anaesthetists, psychologists, nurses and radiographers, i.e. all those involved in the care of women during brachytherapy. No restriction to publication date was applied as it was important to include older papers that referred to LDR brachytherapy as the longer duration of treatment may report experiences and coping strategies that are also relevant to newer techniques of HDR brachytherapy with multiple fractions per insertion and PDR brachytherapy. The search strategy was detailed on the PROSPERO entry.[14]

Key terms used for the search are listed in Table 1.

Additional sources were searched, including grey literature (Open Grey, GreyNet International, UK Institutional Repository Search and The Healthcare Management Information Consortium), three clinical experts from different professions, snowballing of reference lists of included studies and reverse snowballing to insure that no relevant studies had been missed out. Inclusion criteria were any study which focussed on women's experiences of brachytherapy rather than other factors such as local control, survival or radiation dose planning. Studies were included if their main focus was women's experiences of brachytherapy for gynaecological cancers. As there was no set definition of “patient experience” it was decided by the two researchers that studies where pain scores were reported by the patients would be included. There was no restriction on study design or setting. It was agreed that full text articles were required as abstracts would not contain enough detail for analysis, and English language only could be considered due to prohibitive costs of translation services.

Table 1
Key search terms.

Key words and search extent	Search terms
Cancer, neoplasm or tumour in all text	cancer*, neoplasm*, tumo*
AND	
Cervix or gynaecological in all text	cervi*, gyn*
AND	
Brachytherapy or intracavitary in all text	brachytherapy*, intracavit*
AND	
Anaesthesia, sedation or analgesia in all text	anaesthesi*, anesthesi*, sedat*, analgesi*
OR	
Anxiety, stress, anxious, PTSD, psychology, coping, phenomenon, distress in all text	Anxiet*, stress*, anxious*, ptsd*, psychology*, coping*, phenomen*, distress*

Duplicate studies and those reporting the same cohort of patients were removed. The two researchers independently screened firstly by titles then abstracts to exclude articles that were obviously irrelevant. Full text articles were obtained and full texts in other languages were excluded at this point. Any disagreement between the two researchers was discussed at the full text stage and any remaining discrepancies discussed with a third party (academic supervisor-third author) to make a final decision. Assessment of the quality of papers was carried out independently by the two researchers using specific Critical Appraisal Skills Programme (CASP) tool for each type of study design.[15] The results were collated, to improve internal validity and reduce risk of subjective bias. Papers deemed as poor quality (more than 75% No or can't tell to CASP tool questions) were excluded before data extraction and synthesis. This step was a change from the method described in the original PROSPERO publication due to the larger than anticipated number of eligible studies and time limitation to complete data extraction and synthesis and to avoid degradation of findings with poor data. A bespoke data extraction tool was created *‘a priori’* and data extraction was carried out by one researcher (first author) and checked by the second researcher (second author). Data synthesis was carried out by first researcher, then discussed with the second researcher and agreed upon.

Results

The search strategy produced 727 articles and removing duplicates reduced this to 562. Searching of grey literature produced no additional articles. Screening of titles excluded 438 articles leaving 124. Screening of abstracts excluded 78 articles to leave 44. Full text articles were obtained at this point and snowballing and reverse snowballing found two new articles. The 46 full text articles were examined and a further 24 were rejected for the reasons shown in Table 2. There were 22 remaining articles. Five studies were randomised controlled studies (RCTs),[16–20] two case control studies,[21,22] nine cohort studies,[11,12,23–29] five qualitative studies[30–34] and one systematic literature review (Fig. 1).[35]

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