2022

# Pelvic radiation disease and the role of the gut microbiome in gynaecology cancer patients

Bennett, Sophie

Bennett, S. (2022). 'Pelvic radiation disease and the role of the gut microbiome in gynaecology cancer patients', South West Clinical School Journal, 2 (1).
http://hdl.handle.net/10026.1/19727

https://doi.org/10.24382/ehcy-kg97
South West Clinical School Journal
University of Plymouth

South West Clinical School Journal
Online Journal of the South West Clinical School in Cornwall ISSN 2754-9461

Special Edition

#400WORDS: CHIEF NURSE RESEARCH FELLOWSHIP EVIDENCE IMPLEMENTATION PROJECTS

# Pelvic radiation disease and the role of the gut microbiome in gynaecology cancer patients

**Sophie Bennett**[1]

[1]Theraputic Radiographer. Royal Cornwall Hospitals NHS Trust, TRURO, TR1 3LJ, UK.

Email: sophie.bennett@.nhs.net

Submitted for publication: 17 February 2022

Accepted for publication: 27 February 2022

Published: 28 March 2022

## Background

There are four key pillars to cancer control: prevention, diagnosis, treatment and living with and beyond cancer. Developments in prevention, diagnosis and treatment have enabled improvements in survival, with rates doubling in the last 40 years (Quaresma et al., 2015). Yet, patient quality of life beyond cancer has been substantially ignored. Gynaecology cancer patients are typically young and undergo vigorous treatment including surgery, chemotherapy, and radiotherapy. Although treatment is paramount in increasing survival, these treatment modalities increase the risk of severe toxicities. Pelvic radiation disease (PRD), a heterogenous pathology, encapsulates radiation-induced injuries including enteritis, proctitis, cystitis and vaginal fibrosis (Hofsjö et al., 2015, Morris and Haboubi, 2015, Yang et al., 2013). Studies frequently report 10-20% of patients receiving pelvic radiation develop moderate to severe gastrointestinal toxicities (Andreyev et al., 2005, Fuccio et al., 2012, Fernandes and Andreyev, 2021). Furthermore, current developments are unravelling the complex role of the gut microbiome in PRD (Wang et al., 2019).

## Review of the evidence

A literature review was conducted systematically. The eligibility criteria included peer-reviewed journal articles over the last ten years, which were retrieved from CINAHL and Embase databases. Search terms used to identify the appropriate evidence are set out in Table 1.

The literature review highlighted the following key themes:

- Gastrointestinal side effects most prominently reported.
- Limited literature regarding PRD and sexuality.
- Insubstantial evidence of radiation injury at a molecular level for women.
- The gut microbiome's role in PRD is relatively unexplored.

- Limited exploration regarding patient-related factors which may predispose patients to an increased risk of toxicity.

Table 1. Literature Review Search Terms

| Search No. | Search terms | CINAHL | Embase |
|---|---|---|---|
| **1** | (Gastrointestinal OR Gut) AND (micro* OR microbiome) AND (Gynae*) And (Cancer) | 10 | 1 |
| **2** | (Cerv* OR Endomet* OR Ovarian OR Uterine) AND (Cancer) AND (Gastrointestinal OR Gut) AND (Micro* OR Microbiome) | 1 | 90 |
| **3** | (Cerv* OR Endomet* OR Ovarian OR Uterine) AND (Cancer) AND (Gastrointestinal OR Gut) AND (Micro* OR Microbiome) AND (Radiotherapy OR Radiation*) | 364 | 4 |
| **4** | (Cerv* OR Endomet* OR Ovarian OR Uterine) AND (Pelvic Radiation Disease) | 131 | 214 |
| **5** | (Pelvic Radiation Disease) AND (Gastrointestinal OR Gut) AND (Micro* OR Microbiome) | 13 | 3 |
| **6** | Pelvic Radiation Disease | 835 | 52 |
| **7** | (Cerv* OR Endomet* OR Ovarian OR Uterine) AND (Radiotherapy OR Radiation*) AND (Late Side Effects) | 208 | 24 |
| **8** | (Cerv* OR Endomet* OR Ovarian OR Uterine) AND (Radiotherapy OR Radiation*) AND (Late Toxicity) | 0 | 286 |
| **9** | (Cerv* OR Endomet* OR Ovarian OR Uterine) AND (Radiotherapy OR Radiation*) AND (Sexual OR Urinary OR Bowel) | 2 | 32 |
| | | | |
| **Total** | | 1,645 | 705 |
| Total duplicates | | 647 | 30 |
| Total for title/abstract screening | | 998 | 675 |
| Total excluded after title/abstract screening | | 903 | 602 |
| **Total for full-text screening** | | **95** | **73** |
| | | | |
| **Database search limits used** | | | |
| By date to <10 years old<br>By peer-reviewed journal type | | | |

## Project plan

The JBI Model of Evidence-Based Healthcare has been fundamental in planning this project (Porritt et al., 2020). The literature review identifies a knowledge gap in gynaecology cancer care, but also areas to explore within the project. A retrospective audit of radiotherapy patients at the Trust will be executed to assess gynaecology cancer patients from diagnosis to their radiotherapy follow-up. The aim is to gain a deeper understanding of toxicities that patients may experience throughout and after their radiotherapy at RCHT, including the risk of PRD. Once collated, presentations will be shared with stakeholders including clinical colleagues and a patient group. Audit findings and comparable current evidence will be explored to formulate a future clinical study protocol, which will form part of a NIHR Doctoral Fellowship application. A Patient and Public Involvement (PPI) group will be set-up as part of this project and utilised in the preliminary stages of the research study design, as research has shown that a PPI group can improve the quality of research and strengthen the research's effectiveness and meaningfulness (Ocloo and Matthews, 2016).

## References

Andreyev H.J., Vlavianos, P., Blake, P., Dearnalev, D., Norman, A.E. and Tait D. (2005) 'Gastrointestinal symptoms after pelvic radiotherapy: a role of gastroenterologist?', *International Journal of Radiation Oncology*, Biology and Physics, 62(5), pp. 1464-1471.

Fernandes, D.C.R. and Andreyev, H.J.N. (2021) 'Gastrointestinal Toxicity of Pelvic Radiotherapy: Are We Letting Women Down?', *Clinical Oncology*, 33(9), pp. 591-601.

Fuccio, L., Guido, A., and Andreyev, H,J. (2012) 'Management of intestinal complications in patients with pelvic radiation disease', *Clinical Gastroenterology and Hepatology*, 10(4), pp. 1326-1334.

Hofsjö, A., Bohm-Starke, N., Blomgren, B., Jahren, H., Steineck, G. and Bergmark, K. (2017) 'Radiotherapy-induced vaginal fibrosis in cervical cancer survivors', *Acta Oncologica*, 56(5), pp. 661-666.

Morris, K. A. and Haboubi, N. Y. (2015) 'Pelvic radiation therapy: Between delight and disaster', *World Journal of Gastrointestinal Surgery,* 7(11), pp. 279–288.

Ocloo, J. and Matthews, R. (2016) 'From tokenism to empowerment: progressing patient and public involvement in healthcare improvement', *BMJ Quality and Safety,* 25(8), pp. 626–32.

Porritt, K., McArthur, A., Lockwood, C. and Munn, Z. (2020) JBI Handbook for Evidence Implementation, Joanna Briggs Institute. Available at: https://implementationmanual.jbi.global (Accessed 19 December 2021).

Quaresma, M., Coleman, M.P. and Rachet, B. (2015) '40-year trends in an index of survival for all cancers combined and survival adjusted for age and sex for each cancer in England and Wales, 1971-2011: a population-based study', *The Lancet*, 385(9974), pp. 1206-18.

Wang, Z., Wang, Q., Wang, X., Zhu, L., Chen, J., Zhang, B., Chen, Y. and Yuan, Z. (2019) 'Gut microbial dysbiosis is associated with development and progression of radiation enteritis during pelvic radiotherapy', *Journal of Cellular and Molecular Medicine,* 23(5), pp. 3747–3756.

Yang, X., Shelton, J.W., Rossi, P., Bruner, D.W., Tridandapani, S. and Liu, T. (2013) 'Multiparametric Ultrasound Imaging of Vaginal Fibrosis Following Radiation Therapy for GYN Malignancies', International *Journal of Radiation Oncology, Biology and Physics,* 87(2), S427.