Systematic review of intraoperative radiotherapy in pancreatic cancer

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Background

Despite records of intraoperative radiotherapy (IORT) dating back to the early 1900s, modern use remains limited. This systematic review aims to summarise current evidence on the application and safety of IORT in treating pancreatic cancer.

Methods

A systematic review was conducted in line with PRISMA guidelines to determine the survival benefit of IORT. Literature search was performed across PubMed, MEDLINE Ovid and Cochrane by two independent investigators. A third investigator was used in case of any discrepancies.

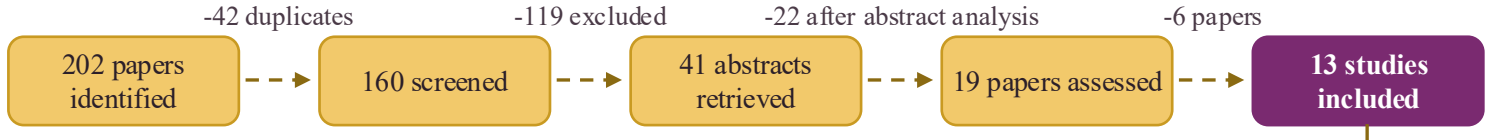
Key words utilised for the search included: Pancreas, Pancreatic Cancer and Intraoperative radiotherapy

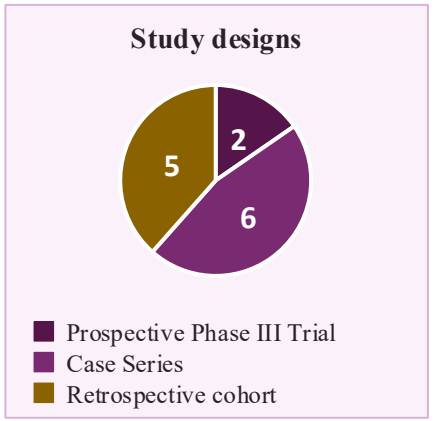
Inclusion criteria:

- All manuscripts featuring the use of IORT for patients with pancreatic cancer published between 01 January 2010 to 31 December 2024
- All patients aged over 18
- All patients treated after the year 2000
- Case series, cohort and case control studies, randomised controlled trials
- Manuscripts available in English

Once selected, studies were stratified into groups depending on resection status. Study design was critically analysed using the ROBINS-I model.

Results







13 eligible studies were included in the review outlining the treatment of **1295 patients.** Risk of bias was a minimum of "moderate" across the included studies as per the ROBINS-I model. Marked heterogeneity in both IORT application and treatment protocol design precluded meta-analysis and data required narrative reporting and analysis.

Key findings

1. IORT is a **safe and feasible therapy** with relatively low and infrequent additional post-operative complications –complications reviewed include pancreatitis, sepsis, DGE, haemorrhage and death
2. IORT benefit was seen only in patients **who also received intensive chemotherapy**, whether adjuvant or neo-adjuvant.
3. IORT can help reduce local recurrence and can be used as a therapy for local recurrence. In patients with local recurrence, **IORT shows signs of greater efficacy than palliative chemotherapy or chemo-radiotherapy alone.**

Conclusion

IORT is a safe and feasible treatment. In patients receiving chemotherapy, IORT could provide additional benefit as part of multi-modality cancer treatment. However further research is required and should focus on potential applicability and acceptability to clinicians and institutions prior to determining its efficacy.