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Original Research

Short- and long-term outcomes following pelvic exenteration for gynae-oncological and colorectal cancers: A 9 year consecutive single-centre cohort study

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HIGHLIGHTS

- There is no significant difference in post-operative short-term morbidity between colorectal and gynaecological specialties.
- Pelvic exenterations for gynaecological malignancy have poorer long-term outcomes including recurrence and 5 year survival.
- Operations for recurrent cancer result in worse disease-free survival compared with primary cancer resections.

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ABSTRACT

Objectives: Radical pelvic exenteration can be undertaken for locally invasive or recurrent disease in both colorectal and gynaecological malignancies. In the UK this procedure is usually undertaken by the respective surgical specialties who have undergone divergent surgical training. This study describes and compares outcomes between colorectal and gynae-oncological teams following pelvic exenteration for primary and recurrent gynaecological and colorectal cancers in a single-centre multi-disciplinary team.
Method: A retrospective review of consecutive pelvic exenteration patients undertaken over a nine-year period in a tertiary referral centre. Analyses comparing short- and long-term morbidity and mortality outcomes were undertaken by chi-square test for categorical variables and Mann-Whitney U for continuous variables. Cumulative survival rates were calculated according to the Kaplan-Meier method and factors associated with recurrence and survival determined using a Cox regression model.
Results: Thirty-four exenterations were undertaken; fourteen colorectal and twenty gynae-oncological. Morbidity was seen in 50% of colorectal and 75% of gynae-oncological patients. Recurrence was seen earlier and with greater frequency in the gynaeoncology group (44.4% and median time 11 months) than the colorectal group (21.4%, median time 41 months; $p > 0.05$). Survival in the gynae-oncology group was also lower than the colorectal group at 1-year (69.6% vs. 92.9%) and 5-years (58.0% vs. 92.9%; $p = 0.115$). The majority of gynae-oncological mortality occurred within 3-years of surgery, whilst the majority of mortality in the colorectal group was after 5-years.
Conclusion: Long-term patient outcome measures, including disease recurrence and 5-year survival, for colorectal exenteration appear better than for gynaeoncology patients, however, no statistical significant difference exists between short-term outcome measures between specialties. This is likely to be caused by different baseline pathologies and disease pattern influencing longer term prognosis but may also be a function of differing surgical thresholds and patient selection bias between specialties. Peri-operative and short-term morbidity appear equivalent despite divergent surgical backgrounds and training.

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1. Introduction

Locally advanced or recurrent pelvic malignancy is associated with a poor prognosis if left untreated, with median survival less than 1 year [1–3]. Traditional compartmental surgery which facilitates the majority of pelvic cancer surgery is often inadequate as locally advanced disease will usually result in cross-compartmental disease [4–9]. Large tumors within the confines of a small pelvis make this a challenging and potentially hazardous surgical endpoint [6,10]. Radical pelvic surgery is associated with significant morbidity [2,11–13], particularly in gynae-oncological resections (overall complication rate 51–82% [1]) where resection of recurrent disease and previously irradiated pelvic tissues or previous operations such as radical hysterectomy damages surgical planes and tissues, often making surgery more complex and associated with higher early and late morbidity [1,2,6,10,14–17]. Additionally, in selected cases with pelvic side-wall disease, laterally extended endo-pelvic resection (LEER) [6,18] can be undertaken in gynae-oncological malignancy with the aim of achieving R0 resection. This can be associated with greater morbidity due to the radical nature of these operations. This morbidity is substantially higher compared to colorectal pelvic malignancy (locally invasive or recurrent disease) which has a reported complication rate of 13–64% [3,19–22]. Earlier recurrence with either local or distant metastasis is associated with lymph node involvement or lymphovascular space invasion and incomplete resection margins [2,5,11,12,23,24]. Recurrence in gynaecological malignancy commonly occurs early with a median time to recurrence of 6.1–7 months [16,25]. Philosophically this may, and is likely to, reflect aspirations of differing surgical endpoints by each specialty. Colorectal surgical teams in general only ever embarking on surgery where R0 resection and curative surgery is feasible; in comparison to gynaecological exenteration where surgical aspiration is similar but often comes with the acceptance of potentially palliative debulking surgery in this heterogenous younger patient group.

Correct patient selection followed by complete enbloc cytoreduction is the only means by which disease-free long-term survival can be achieved [1–3,11,19]. In this complex cohort of patients, it is important to establish whether outcomes following radical pelvic surgery are universally poor and related in the longer-term to disease pathology or are determined by short-term peri-operative and 90 day morbidity irrespective of the underlying pathology. Alternatively, it may reflect the differing surgical training and expertise between the specialities. This study is the first to compare outcomes following pelvic exenteration for gynaecological and colorectal cancers in a single-centre multi-disciplinary team, and proposes a universally equivalent model for short-term endpoints with the traditional sub-specialty approach to colorectal and gynae-oncological exenterations. Longer term morbidity and mortality is also highlighted.

2. Methods

2.1. Settings

This study was performed in a tertiary referral centre undertaking pelvic exenteration for gynae-oncological and colorectal pelvic malignancy. We retrospectively reviewed patients from a prospectively maintained database who underwent pelvic exenteration over a nine-year period from January 2007 to May 2016. All patients were reviewed pre-operatively in a multidisciplinary team meeting where dual consultant operating was performed for all cases. For colorectal cancer, this team included colorectal surgeon and urologist; and for gynaecological cancer, two experienced gynae-oncology surgeons. All colorectal patients underwent preoperative CT-PET and MRI, whilst the gynaecology patients all underwent preoperative MRI pelvis, CT and cystoscopy. All patients had a Bricker ileal conduit formation [4] and formation of end colostomy.

2.2. Inclusion/exclusion criteria for patients

Consecutive patients undergoing pelvic exenteration were included in analyses, records were retrospectively reviewed, and patient details and outcomes included. Patients listed for exenteration who did not proceed due to inoperability at laparotomy were excluded from analyses.

2.3. Statistical analysis

Patient demographics included age and gender; operative characteristics included: speciality, operation type and duration of operation; and patient outcomes included: length of hospital stay (LoS), complications within 90-days of procedure, urological complications, readmissions, recurrence and survival. Primary outcome measures were short-term morbidity and mortality (within 90-days of procedure); whilst secondary outcomes were long-term morbidity, recurrence and mortality. The Clavien-Dindo classification was used to categorize complications according to severity [26]. Comparative analyses were by chi-square test for categorical variables and Mann-Whitney U for continuous variables. Survival time was calculated from the date of resection of the tumor until the last follow-up attendance or until death. Logistic regression was used to identify independent predicting factors for complications. Cumulative survival rates were calculated according to the Kaplan-Meier method in Stata version 14.1. Factors associated with recurrence and survival were determined using a Cox regression model. Factors with a p value < 0.2 in the univariate models were entered into multivariate models. The multivariate models were built by inclusion of these variables which achieved a p-value >0.05 and significant improvement of model fit (reduction in Akaike's Information Criterion ≥ 4) [27,28]. A p-value of less than 0.05 was considered to be significant.

3. Results

3.1. Gynaecological cancers

3.1.1. Patient characteristics

Twenty-eight women had scheduled pelvic exenteration. Eight of this group at laparotomy were found to have irresectable disease and exenteration was abandoned (28.6%). Twenty women underwent pelvic exenteration for gynaecological malignancy with median age of 61 years (range: 31–87 years) (Table 1). The median follow-up in this group was 17.9 months (range: 0.2–89.1 months).

3.1.2. Pathology

Five patients underwent resection for locally invasive cancer with fistulation (25%) whilst fifteen underwent resection for recurrent cancer (75%). Six cancers were adenocarcinoma; eleven were squamous cell carcinoma (six cervical, four vaginal and one vulval origin); one was malignant melanoma and two were serous papillary carcinoma. Ten percent of patients had positive resection margins (R1; $n = 2$).