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Resource implications of risk-reducing mastectomy and reconstruction

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Abstract

Aim: Risk-reducing mastectomy (RRM) is on the increase, now frequently combined with breast reconstruction (BR). However, the resource implications associated with bilateral mastectomy and reconstruction are unknown. This study assessed the overall cost of performing risk-reducing surgery.

Methods: All cases of RRM and BR performed between 1991 and 2011 at this hospital were identified from a prospectively collected database. All patients undergoing bilateral mastectomy were included, when at least one mastectomy was risk-reducing. Overall treatment costs for all surgical procedures, complications, revisional procedures and outpatient attendances were calculated and compared to the National Tariff allowed. Mann–Whitney *U* and Fischer's exact tests were used to calculate levels of significance.

Results: Fifty patients underwent bilateral mastectomy and BR (median follow up 20 [range 1–106] months), 72 were Latissimus Dorsi reconstructions (LDR) and 28 were Subpectoral reconstructions (SPR). LDR took longer than SPR ($p = 0.001$), with a greater length of stay ($p = 0.024$). Nine percent of patients returned to theatre for early complications, but the type of BR did not influence the early complication rate (LDR *versus* SPR, $p = 0.345$) or the need for additional unplanned procedures (LDR *versus* SPR, $p = 0.671$). The overall mean cost for bilateral RRM and BR was £14,797 per patient. The inpatient cost for bilateral RRM and LDR was £10,082 compared with £5,905 SPR. Both procedures exceeded the £5,697 tariff allowed in the UK.

Conclusion: Bilateral RRM and BR is a safe procedure, but the resource implications are considerable and exceed the tariff allowed, particularly when performing more complex techniques.

Keywords: Risk reducing mastectomy; Breast reconstruction; Cost

Introduction

More risk-reducing mastectomies (RRM) are being carried out as a result of greater knowledge of genetic risk factors, evidence of benefit, a rising demand, and wider availability.[1–7] Indications for RRM include a strong family history of breast cancer, BRCA1 and BRCA2 mutations, and a personal history of breast cancer. RRM is an effective strategy both for those with a previous history of breast cancer (contralateral RRM) and for those at high genetic or familial risk (bilateral RRM), reducing risk by up to 95%.[7–15] Women often request immediate breast reconstruction (BR) at the time of mastectomy, as this has both psychological and aesthetic benefits[16,17] but bilateral RRM and immediate BR is a major, labour-intensive procedure which is associated with a significant period of recovery. Moreover, the majority of patients will subsequently require further surgical procedures.[18]

The combined costs of RRM and immediate BR, together with any further revisional surgery are considerable. Currently risk-reducing surgery is routinely funded in the UK by the National Health Service (NHS). Other breast procedures such as breast reduction or surgical correction of gynaecomastia are funded only when strict criteria are met. 'Payment By Results' (PBR) was a new system of funding which was introduced in 2002 as part of NHS reforms in the UK, now known as the NHS National Tariff Payment System.[19] PBR changed the funding framework so that hospitals are paid for each patient's admission, and this admission is coded according to the

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activity generated by the admission and charged accordingly. Tariffs are set at a rate that encourages high quality care and which promotes efficiency. This means that the actual cost to the hospital of performing a given procedure may exceed the tariff received for it. This is relevant to risk-reducing surgery, as a recent study has disclosed a shortfall in funding for bilateral mastectomy with autologous reconstruction, because a bilateral procedure attracts the same tariff as a unilateral case. Secondly, BR varies in its complexity, and although differing levels of skill and resources are required, reimbursement is often the same.[20]

Healthcare spending is under intense scrutiny worldwide. Despite the recent global economic downturn, an increasing proportion of Gross Domestic Product (GDP) in Organisation for Economic Cooperation and Development (OECD) countries is now being spent on healthcare, in order to try and meet the increasing demands placed upon healthcare systems. The sustainability of this in Europe has been carefully reviewed in several recent reports[21,22] and a key reform recommendation is the enablement of strategic resource allocation to ensure that health resources match health needs. However, there has been no attempt to cost risk reducing mastectomy and reconstruction. The aim of this study was to assess the resource implications of providing an 'in house' oncoplastic service for RRM and BR at a District General Hospital, in relation to the level of funding provided by the NHS in the UK.

Patients and methods

An analysis was carried out of all patients who underwent RRM and BR over a 20 year period (1991–2011) at The Royal Hampshire County Hospital, Winchester, UK. Patients were identified from a prospectively collected Unit Database, and the study included all patients treated by bilateral mastectomy, with at least one mastectomy being risk-reducing. Patients who had bilateral breast cancer were excluded. Indications, patient and operative details, complications, secondary procedures and outpatient attendances were recorded.

The overall treatment cost was calculated retrospectively, based on the present day costing of providing the same service, rather than historical pricing. This included the cost of the index procedure (bilateral RRM and BR), together with the pre- and post-operative outpatient costs, and any secondary procedure costs. The index procedure cost included the use of the operating theatre, the hospital stay, implants, transfusion, and all pathology costs. The finance department confirmed the hourly rate for theatre, including all theatre staff. Outpatient costs included all investigations carried out (for example, mammography or MRI). All implant use was recorded, and current prices were used to calculate the overall cost of implants both for the initial reconstruction and any subsequent replacements.

Mann–Whitney *U* and Fischer's exact tests were used to determine statistical significance. Results were considered significant when $p < 0.05$.

Results

Fifty patients underwent bilateral RRM and BR (mean age 45 [27–67] yr). Seventy eight percent were <50yr (Table 1). A steady rise in demand was observed during the study period, with over half of the patients undergoing surgery since 2006 (Fig. 1). Genetic risk (44%) and familial risk (44%) were the leading reasons for RRM (Fig. 2). Women with a genetic risk were younger than those with a familial risk (genetic risk, 40 [27–50] yr *versus* familial risk, 48 [31–60] yr, $p = 0.001$). All remaining patients without a genetic predisposition or a family history who underwent RRM had a previous history of breast cancer. Patients had little co-morbidity, the commonest risk factor being a history of smoking (Table 1). 28 patients were referred from the local population, whilst 22 patients were extra-regional referrals.

Of 100 procedures performed in 50 women, 70 of the mastectomies were RRM and 76 of the BRs were immediate. Sixty-six percent were bilateral mastectomies (BM)

Table 1
Patient demographics.

Demographic	Number of patients
Age < 30	5
Age 31–40	12
Age 41–50	22
Age > 51	11
BMI > 30	6 (SP = 2, LD = 4)
DM	0
Smoker	14 (SP = 6, LD = 8)
Ex-smoker	3 (SP = 1, LD = 2)
ASA III/IV	0

SP = Subpectoral Reconstruction, LD = Latissimus Dorsi Reconstruction, DM = Diabetes Mellitus, BMI = Body Mass Index, ASA = American Society of Anaesthesiologists.

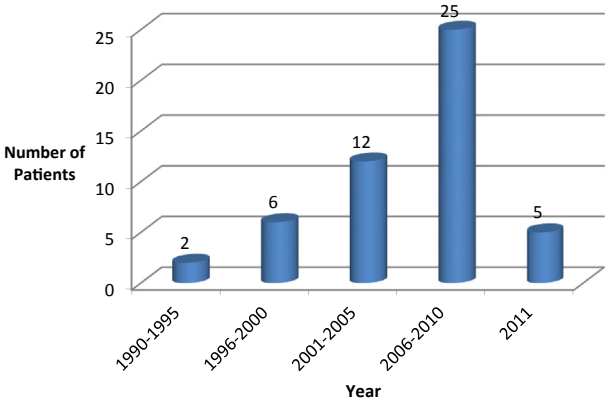

Figure 1. Workload over time.