

‘No ordinary meeting’: Robert McWhirter and the decline of radical mastectomy

JJH Newmark

Medical Student, College of Medicine and Veterinary Medicine, University of Edinburgh, Edinburgh, UK

ABSTRACT On 7 January 1948, a meeting was held at the Royal Society of Medicine in London. Its purpose was to settle a controversy. Robert McWhirter, an Edinburgh-based radiotherapist, had been invited to defend the scandalous position advocated by Geoffrey Keynes ten years previously: that radical mastectomy offered no survival advantage when compared to simple mastectomy plus local radiotherapy. The negative publicity surrounding the meeting proved overwhelming for Keynes and he abandoned his research. Indeed, the events of the meeting may have been quietly buried were it not for McWhirter who, over the following decade, pursued Keynes’ research. He refined his technique, sparing patients the disfiguring and painful radical mastectomy without compromising overall survival. Later, he garnered support from other researchers, which led to a series of papers confirming his original findings. Towards the end of his career, he also made contributions to service organisation and hormone therapy, eventually holding the Presidency of the Faculty of Radiologists. By keeping the controversy alive, McWhirter was instrumental in overturning 60 years of surgical dogma. He remains a pivotal figure in the history of breast cancer.

Correspondence to J Newmark
 Chancellor’s Building
 49 Little France Crescent
 Edinburgh EH16 4SB
 UK

e-mail s0906103@ed.ac.uk

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The atmosphere was so charged with emotion that it became abundantly obvious that the meeting had been called...to provide an occasion whereby the Edinburgh method could be publicly condemned.¹

BEFORE THE MEETING

Foundations of breast cancer management

The latter half of the 19th century marked a significant turning point for the management of breast cancer. Attempts to excise breast cancer ‘masses’ had been recorded since classical antiquity, yet surgery as a means of treatment remained rare, chiefly due to the pain of the operation and risk of sepsis. Clinicians working in Edinburgh during the 19th century made several contributions to breast cancer management, not least in the areas of antiseptics (Lister) and anaesthesia (Simpson). Lister even applied his techniques to the mastectomy of his own sister in 1867.² Yet despite these innovations, disease-free survival remained rare. From the 1880s onwards, James Halsted, a surgeon practising at Johns Hopkins Medical School in Maryland, devised the ‘radical’ mastectomy (radical, in this case, was intended to reflect the Latin origin of the word, meaning ‘root’), which removed the breast, pectoralis major and minor, and the axillary lymph nodes. Halsted’s argument, that cancer spread much

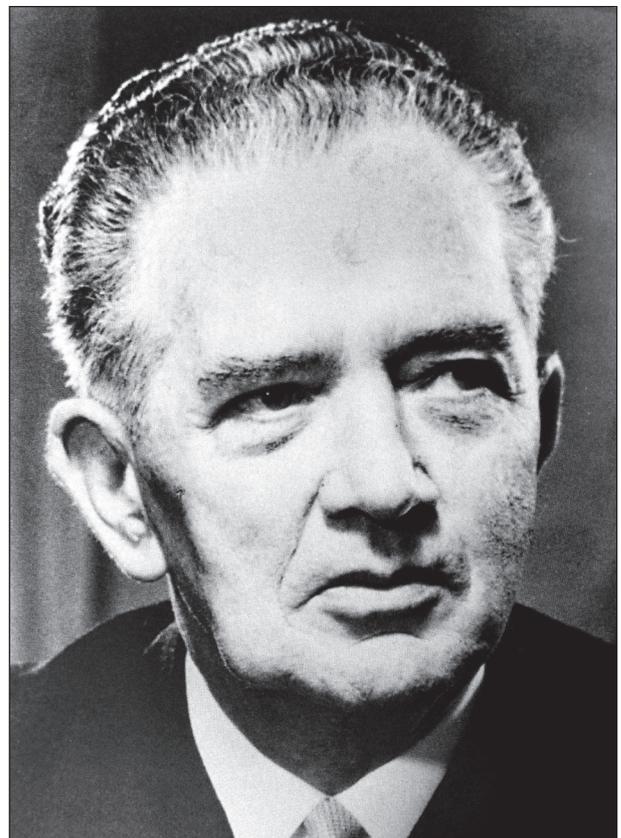


FIGURE 1 Robert McWhirter. © Lothian Health Board Archives. Reproduced with Permission

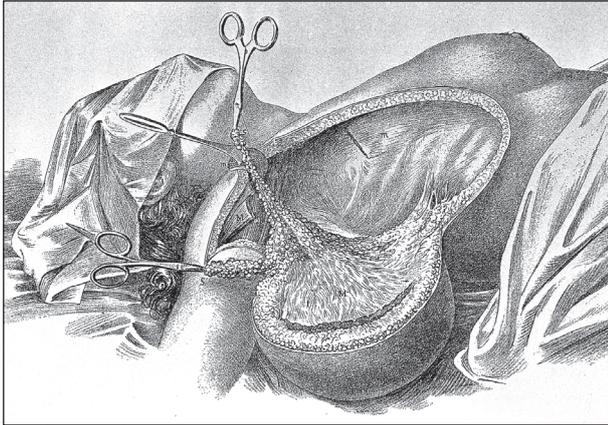


FIGURE 2 Engraving of a radical mastectomy produced by William Halsted in 1924. Reproduced from Wikimedia Commons. © Wellcome Trust

like a ‘centrifugal’ spiral, was highly compelling in an era where clinical observation took precedence over the nascent science of pathophysiology.³ It was argued that the radical mastectomy, while being disfiguring and drastic, nevertheless offered the best chance of a cure. Over the next 30 years, Halsted’s operation gained a global following, which included many prominent British surgeons.

Early breast cancer radiotherapy and the arrival of McWhirter

By the turn of the century, clinicians, both in Edinburgh and elsewhere, had a new tool to treat cancer, including breast tumours. Following the discovery of X-rays, the new specialities of ‘radiology’ and ‘radiotherapy’ quickly developed and were subsequently integrated into cancer treatment. Responding to demand for these new specialities, the ‘medical electrical department’ was established at the Royal Infirmary of Edinburgh (RIE) in 1896 and began treating breast cancer patients.⁴

By the mid-1930s, the medical electrics department at the RIE had been renamed the radiological department. However, by this point it was in some difficulty. The equipment was outdated; so much so that, ‘the reports [were] of so little value that it was left to the clinical staff to make their own interpretation’.⁵ The appointment of Robert McWhirter as the new departmental head may have been intended to reverse the decline. McWhirter, a radiologist, had gained broad experience of radiotherapy both in the USA and London, and had received his Fellowship Diploma of the Royal College of Surgeons, Edinburgh. He had also worked in the department for three years. In 1937, the hospital’s Radium Committee recommended that there should be ‘improved facilities for diagnosis and earlier diagnosis’ and ‘improved facilities for treatment’.⁵ According to a memorandum written by

TABLE 1 Survival rates for all breast cancer patients referred to the Royal Infirmary of Edinburgh between 1940–1945.⁵

Years after treatment	Survival rate
1	80.7%
2	66.0%
3	55.1%
4	47.9%
5	43.7%

McWhirter, it was ‘generally not appreciated how great also is the medical delay in seeking suitable treatment’.⁵ Plans were subsequently drawn up for a new department of radiotherapy

Against orthodoxy

By 1940, the treatment received by breast cancer patients in Edinburgh would have been very different to the treatment received by patients at the end of the 19th century. The plans for an expanded radiotherapy service had been held back because of the outbreak of the Second World War.⁶ However, this did not prevent the dramatic increase in breast cancer radiotherapy referrals; 1,545 breast cancer patients were referred for radiotherapy in 1941, up from three or four per year at the turn of the century.⁵

Meanwhile in London, Halsted’s radical mastectomy had received its first challenge. Geoffrey Keynes, a surgeon practising at St Bartholomew’s Hospital, London, was publically disagreeing with the principles underpinning Halsted’s approach. Keynes, learning that radium was being used to treat breast cancer in Chicago, had the novel idea of combining radium with localised surgery. Publishing in the *Annals of Surgery* in 1937, he concluded that, ‘...dissection of the axilla may be harmful...’,⁷ and that his method was at least as effective as the treatments of the day, carrying with it far less morbidity and psychological distress.

McWhirter was intrigued. He had heard about Keynes’ research while practising at St Bartholomew’s in the early 1930s.¹ Sufficiently convinced, McWhirter decided to recommend against radical mastectomy within his department. Sir John Fraser, then Clinical Chair of Surgery, called a meeting at which McWhirter, ‘outlined the possible advantages of simple mastectomy followed by radiotherapy to the chest wall...the proposed new approach to the treatment of breast cancer was unanimously approved’.⁵ The ‘Edinburgh’ method was subsequently adopted by all surgeons practising at the RIE. Reporting to the UK Radium Commission four years later, McWhirter wrote that ‘the main method of treatment has been simple mastectomy and post-operative radiotherapy. This method has been now been in use since 1941’.⁵ The report also included the results of a five year follow-

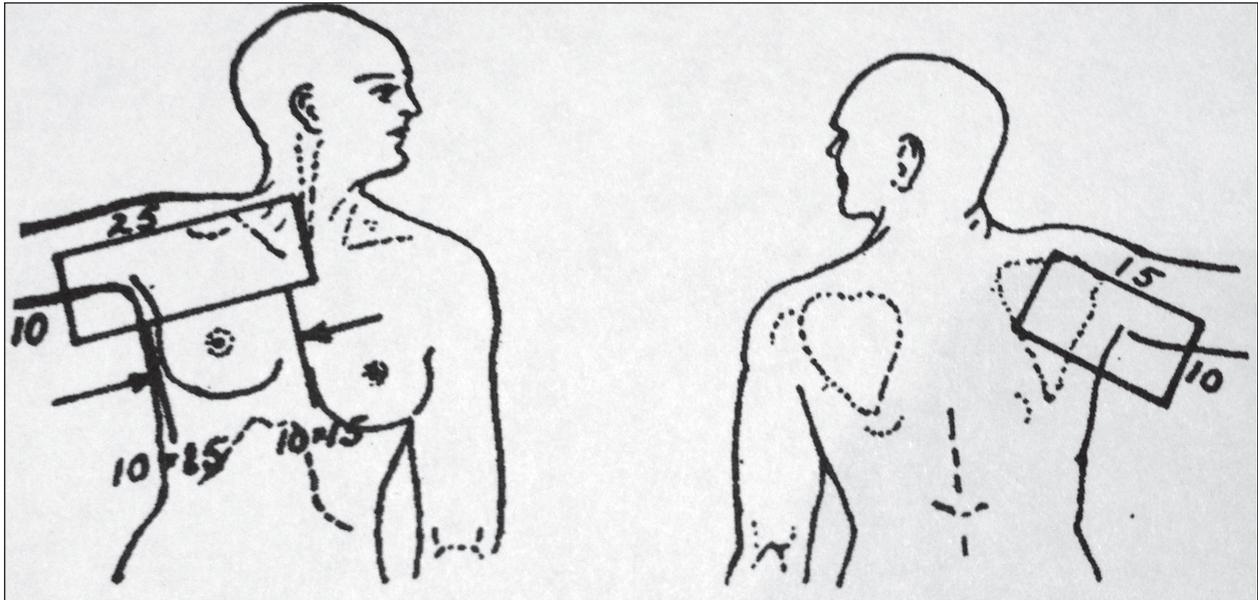


FIGURE 3 Diagram included in McWhirter's first paper on simple mastectomy plus radiotherapy – method of breast irradiation¹³

up (1940–1945) of all patients treated over this period (Table 1).

McWhirter was encouraged by these results, which compared at least as well with other university hospitals. For example, in 1943 the department of surgery at Columbia University, New York, reported a five year survival following radical mastectomy of 40%, in all patients.⁸ Two years later, the Middlesex Hospital in London reported survival rates of 25% following radical mastectomy, where patients had evidence of axillary disease.⁹ McWhirter reported 29% survival where patients had axillary disease. Crucially, he could achieve these results while sparing patients radical mastectomy.

THE MEETING

A call for attendees

By 1947, Keynes and McWhirter had established themselves as the leading (and almost lone) figures opposing radical mastectomy. They stood in stark contrast to the rest of the surgical world, which had been considering the value of ever more 'radical' versions of the radical mastectomy, including the 'extended' radical mastectomy later proposed by Urban and Baker in 1952.¹⁰ On 7 January 1948, a meeting was called in London to debate the issue, and more specifically challenge McWhirter on his research. Hostility surrounding the meeting was immense, and Keynes attended the meeting in support of his colleague. The meeting hall was packed, so much so that McWhirter had difficulty squeezing in.¹

The talks

The meeting began with several surgical luminaries giving their own view on radical mastectomy. Sir Stanford Cade opened proceedings, claiming the success he had achieved with radical mastectomy at Westminster Hospital. In the *British Journal of Radiology*, which recorded the events of the meeting, Cade, himself an early pioneer of radiotherapy in treating malignant disease, argued against simple mastectomy, 'As a clinician, I am not attracted by removing part only of a cancer...I prefer to offer the patient, if otherwise suitable, the bigger and, in my view, the better of the two operations'.¹¹ Cade was followed by Sir Gordon Gordon-Taylor, who presented somewhat fantastical figures; a 67% survival rate for his radical mastectomy patients. McWhirter reports that the only person brave enough to ask a question was a Mr Duncan Fitzwilliam, who pointed out that the survival rate of Gordon-Taylor's control group (who did not have breast cancer) was actually lower than the group that had cancer. Mr Fitzwilliam 'went on to draw the obvious conclusion'. Gordon-Taylor did not reply, and 'the President's call for further questions was met with a stony silence'.¹ In such an ill-tempered atmosphere, it is hardly surprising that the findings were initially viewed with scepticism by the surgical establishment in Britain (though less so in the USA where postoperative irradiation was more common). As a clinician based in London, it was especially difficult for Keynes; many of those who spoke in defence of radical mastectomy were his colleagues. Perhaps understandably, he abandoned his breast cancer research in favour of topics less likely to engender opposition from the medical profession.³

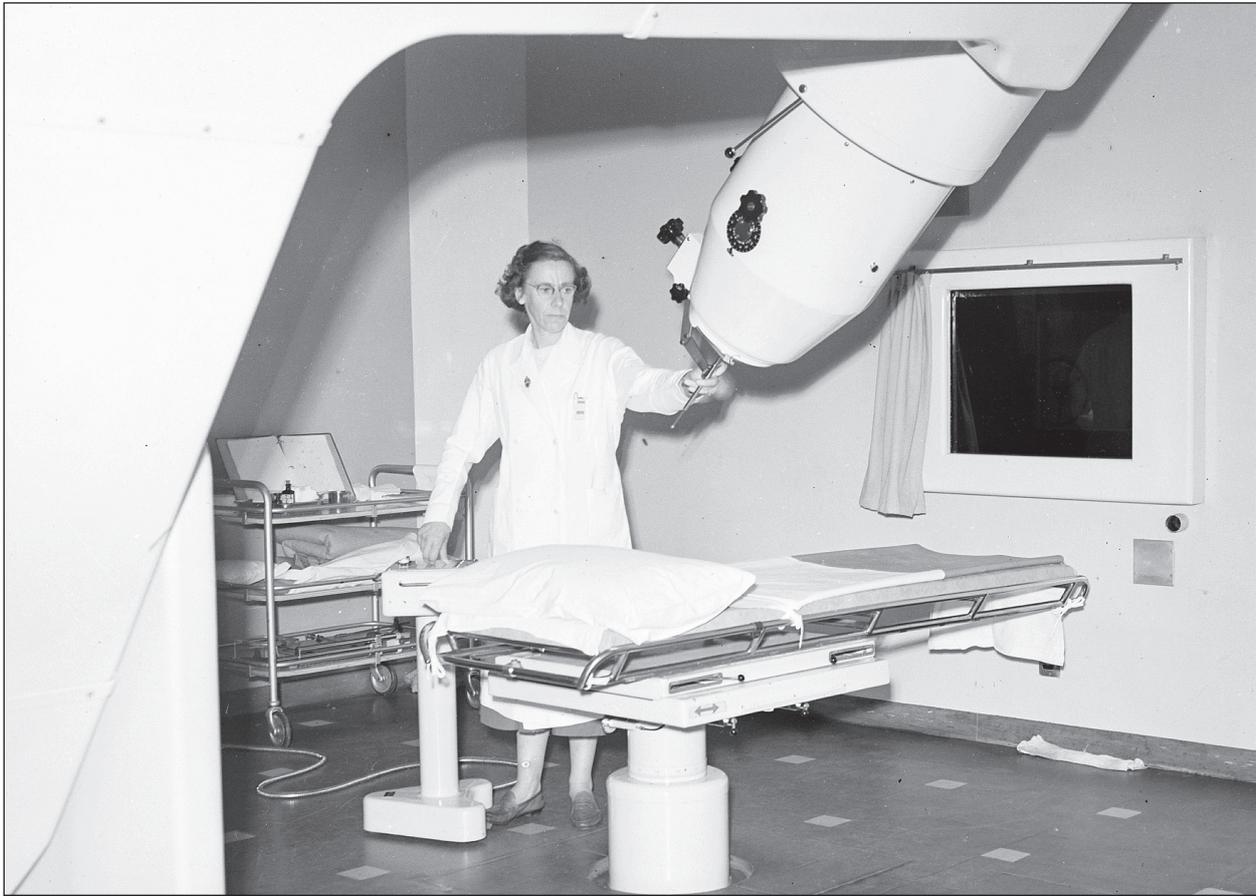


FIGURE 4 New Radiotherapy Department, Western General Hospital, Edinburgh (1953). © The Scotsman Publications Ltd

AFTER THE MEETING

McWhirter persists

The vilification Keynes received for arguing against the Halstedian theory apparently did not dissuade McWhirter from doing likewise. A year after the meeting, he published his findings in the *British Journal of Radiology*,¹² and the same findings were published again in 1949.¹³ In these papers, McWhirter described the methods of carrying out his treatment method in a stepwise fashion, including diagrams. Despite the resistance McWhirter had initially met, his findings were not completely ignored. Three years after McWhirter had spoken at the Royal Society of Medicine, Sigvard Kaae and Helge Johansen initiated a study comparing ‘McWhirter’s method’ to extended radical mastectomy.

Kaae’s study was one of the largest performed for thirty years, comparing 382 patients (183 radical mastectomy, 199 McWhirter’s method). They too found that five year survival for all patients was identical in both categories.¹⁴

Two studies had now found that radical mastectomy offered no additional benefit compared with simple mastectomy and axillary irradiation. Yet for the overwhelming majority, neither offered sufficiently compelling reasons to abandon radical mastectomy. A 1955 critique of McWhirter’s work, concludes that, ‘There is apparently nothing magical about McWhirter’s treatment of cancer of the breast...’¹⁵

Work on hormonal manipulation

However, irrespective of the operation used, overall survival of breast cancer remained poor. Towards the end of the decade, McWhirter decided to try a new approach, hoping to augment his ‘Edinburgh’ method. Between 1948 and 1949, the radiological department trialled irradiation of the axilla and the ovaries, following simple mastectomy.¹⁶ The technique of targeting the ovaries for destruction in breast cancer was not new; in 1896 Sir George Beatson, Director of the Glasgow Cancer Hospital, and a former student of Lister, had observed that bilateral oöphorectomy could cause a degree of remission in breast cancer.¹⁷ By McWhirter’s own admission, the extent to which irradiation replicated excision was debatable. His results indicated that there was no additional benefit in

survival, and he abandoned the procedure. A different approach was attempted. Between 1940 and 1950, treatment in the form of oestrogen preparations or testosterone, and ovarian or pituitary radiation alone, was also being used to treat inoperable cancer. Like oöphorectomy, the use of hormone preparations, and indeed pituitary irradiation, for breast cancer had been pioneered elsewhere. Here, the results were more favourable, with 30% of pre-menopausal breast cancer patients benefiting from ovarian irradiation alone, with some post-menopausal women also deriving benefit from stilboestrol.¹⁶

McWhirter's later work

Although McWhirter's work on hormonal manipulation was not particularly successful, his robust approach towards his critics had impressed his academic colleagues. In 1946, the University of Edinburgh appointed him as Forbes Professor of Medical Radiology, the first to hold the chair. This reflected a number of changes, partly driven by McWhirter's own desire to improve cancer services in Edinburgh, partly by the passing of the National Health Service (Scotland) Act 1947 and Cancer Act 1939.¹⁸ Hospitals were now obliged to expand and improve their services in preparation for free treatment, including that of breast cancer. The development plans drafted in 1937 were now re-examined. After attempts at expanding existing facilities proved insufficient to meet demand, the era of Edinburgh's breast cancer patients receiving radiotherapy at the RIE came to a close. In 1953, the department of radiotherapy moved from the RIE to the Western General Hospital.⁶ The department was housed in a purpose-built building, which included wards, an operating theatre and a radium room. Resomax 300kV X-ray generators were installed to provide a more powerful source of radiation, and were used mainly by breast cancer patients. The majority of surgical operations for breast cancer continued to be performed at the RIE until the early 1990s.

Following the transfer of services, McWhirter began to focus heavily on broader aspects of breast cancer management. In 1957, he published a paper detailing prognostic aspects of breast cancer.¹⁹ A standardised way of 'clerking' breast cancer patients had also been introduced by McWhirter, which included clinical examination, history and staging. By this point, more studies confirming McWhirter's theories about the usefulness of postoperative irradiation had been published.²⁰ Importantly, these studies had been performed by individuals in the USA, where Halsted's procedure still had a devoted following, though they still made little impact on practice. The appointment of McWhirter as Director of South East Scotland's Radiotherapy service, just prior to the new cancer centre opening, put him in a more managerial role, and he spent considerable time teaching students.¹³

One of McWhirter's final acts as departmental head was to approve the appointment of Eric Samuel as Director of the radio-diagnostics department. A previous appointee, Bruce Young, collaborated with Samuel to refine techniques for breast imaging, including thermography and mammography. By the time both of his appointees were publishing promising results, McWhirter was approaching retirement.²¹ This is not to say he was any less busy; he had held the Presidency of the Faculty (later Royal College) of Radiologists between 1966–1969 and lectured around the world. In 1963, he was invited to deliver the Caldwell Lecture at the American Roentgen Ray Society, with a talk entitled, 'Should More Radical Treatment Be Attempted in Breast Cancer?'.²² He concluded his career by sitting on numerous committees, including the Scottish Home and Health Department.¹ McWhirter's role in establishing Edinburgh as a site of breast cancer research led to the foundation of the Edinburgh Breast Unit in the early 1970s. The Edinburgh Breast Unit, led by Sir Patrick Forrest, would become the largest test site for the mammography screening trials of the 1980s, fundamentally altering how breast cancer was initially managed in the UK.²³ A year prior to the Edinburgh Breast Unit being set up, McWhirter retired. Of his trainees, 20 had gone on to lead radiotherapy departments all over the world.¹

CONCLUDING REMARKS

McWhirter undoubtedly had a successful and varied career. While his work on hormonal manipulation and service organisation was important, his achievements in the field of radiotherapy stand out as both remarkable and enduring. As recently as 2014, the AMAROS trial, comparing axillary dissection vs irradiation in terms of survival and morbidity, concurred with the position first proposed by McWhirter over 60 years ago.²⁴

McWhirter was not, of course, the sole reason radical mastectomy ultimately fell out of favour. A greater understanding of metastatic disease, a series of trials confirming McWhirter's work and Keynes' original observations, ultimately came together to form a body of overwhelming evidence. Unfortunately, performing blinded randomised trials was not something that McWhirter chose to pursue. It is open to debate whether randomised trials in Edinburgh might have significantly hastened radical mastectomy's demise. It seems unlikely that McWhirter did not conduct a large clinical trial because he was unwilling to subject his theory to scrutiny; McWhirter was extremely public about his research. One possible reason is that McWhirter devised his theories in an era when large scale clinical trials were rarely performed. By the time large trials were commonplace, McWhirter was approaching retirement. Fisher's trial, one of the largest

to provide evidence against Halstedian theory and radical mastectomy, is often credited as marking the end of routine radical mastectomy.²⁵ While this may be correct, the authors of this study owe much to McWhirter for keeping the controversy alive up until then. By being committed enough to do so, he has ensured that millions every year are offered the best chance of a cure, while retaining far more of their physical integrity than they might have done 40 years ago. Few clinicians can claim such a legacy.

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