



DOI: 10.32768/abc.202183247-250

Impalpable Breast Cancer and Service Delivery During the COVID-19 Pandemic – the Role of Radiofrequency Tag localization

Jonathan Strickland^{a,b}, Beatrix Elsberger^{a,b}, Gerald Lip^{a,b}, Mairi Fuller^{a,b}, Yazan A Masannat^{*a,b}^a Aberdeen Royal Infirmary, NHS Grampian, Aberdeen, Scotland, UK^b School of Medicine, University of Aberdeen, Aberdeen, Scotland, UK

ARTICLE INFO

Received:
06 April 2021
Revised:
09 May 2021
Accepted:
13 May 2021

Key words:

Breast cancer,
breast surgery,
radiofrequency tag,
Covid-19

ABSTRACT

Background: Radiofrequency tags are used to localize breast lesions for surgery. During the Covid-19 pandemic, these offered the flexibility of inserting the Tags days or weeks before surgery. This made logistics of planning theatres lists easier, especially with most of the lists having been moved off site.

Methods: In the 7 weeks following the first lockdown in the UK, we reviewed all planned admissions for breast surgery looking at the types of surgery offered, type of localization used and assessed which cases would not have been able to go ahead had radiofrequency tags not been available.

Results: Out of 85 planned admission, 83 had surgery, 11 were for re-excision of margins and 72 for their first breast surgery excision (mastectomy or breast conservation). Out of the 54 that had breast conserving surgery, 40 needed localization, out of whom 27 had radiofrequency tags. Looking at theatre order list and location of surgery, 20 out of the 27 would not have had their surgery had radiofrequency tags not been available, which is 50% of the patients needing localization.

Conclusion: Radiofrequency tags are new devices used for breast lesion localization that offer a much-needed flexibility especially as seen during the Covid-19 pandemic.

Introduction

The SARS-COV-2 (Severe Acute Respiratory Syndrome Coronavirus 2), also known as Covid-19 pandemic has prompted a significant global change in the provision of health care services. In the UK, elective surgery was suspended and although emergency surgery and urgent cancer surgery was intended to continue with 'business as usual', there were issues with logistics and capacity, impacting urgent cancer treatment plans across all four nations in the UK. This was mainly due to the reduction in

the number of hospital beds, theatre availability and redeployment of staff to the acute sector and critical care. Additionally, changes in practice to mitigate Covid-19 transmission risk impacted on clinical capacity.¹

The increased risk posed by Covid-19 resulted in changes to management plans for many cancer patients. In breast cancer in particular, this included avoidance of neoadjuvant chemotherapy with a move to surgery first, and for some the use of temporary endocrine blockade, until a safe surgical window became available. Furthermore, the type of surgery offered also changed with less choice to both patients and clinicians. Most immediate total breast reconstructions were put on hold and many of the more complex mammoplasty techniques were modified to simpler operations on the cancer side alone, avoiding symmetrising procedures. This prompted a radical change in the approach to surgery with new guidelines emerging aimed at helping

* Address for correspondence:

Yazan Masannat, MD
Consultant Oncoplastic Breast Surgeon
The Breast Unit, Ward 315, Orange Zone, Aberdeen
Royal Infirmary, Foresterhill Campus, Aberdeen, Scotland,
UK, AB25 2ZN
Tel: +44 (0) 1224 552 739,
Email: yazanmas@hotmail.com;
yazan.masannat2@nhs.scot



decision making.¹⁻³

In breast surgery, theatre lists have considerable logistical requirements, in particular joint radiological planning with localization of impalpable tumours. The standard approach for many decades has been the insertion of a guide wire into the lesion on the day of surgery.⁴ With the change in service delivery due to the pandemic, the logistics of breast surgery theatre list planning became more complex, specifically taking account of the need for radiologists, along with the support of radiographers to wire localize breast lesions. With the uncertainty regarding staffing due not only to redeployment but with the potential for staff being off sick or self-isolating, lists with wire localizations could not be planned with any certainty. Furthermore, many National Health Service (NHS) trusts moved their cancer surgery off site, to a 'cold site', and thus remote from their main radiology departments where localizations would take place. Locally, our NHS Trust, NHS Grampian, was able to partner, early on, with the private healthcare provider BMI Albyn Hospital to maintain elective cancer services but keeping some theatre capacity at Aberdeen Royal Infirmary (ARI), which is the main NHS Site for the higher risk patients.

New tumour localisation techniques have been emerging to replace wire localisations including radioactive¹²⁵-Iodine Seeds⁵, Magseed⁶, and radiofrequency (RF) tags.^{7, 8} Previous publications have demonstrated their safe use in clinical practice. Our unit started to trial RF tags in the beginning of 2020. These are small tags but larger than the usual marker coil with a RF transmitter in them. They are mounted on a needle applicator and inserted, image guided into the tumour site which can be done days or even weeks prior to surgery. Intraoperatively, the localizer portable handheld reader and probe are used to identify the location of the RF tag to aid the surgical excision.

In our unit, these new localization techniques were pivotal in reconfiguring our service during the pandemic because of the flexibility offered. When the UK moved from the "contain" to the "delay" phase in mid-March 2020, RF tags were seen as an important part of the breast surgical unit strategy planning to provide the flexibility needed. In this retrospective case series, we looked at the effect of using RF tags for breast lesion localization to accommodate the change in service delivery during the first lockdown.

Methods

This is a retrospective case series of all patients with planned admission for breast cancer surgery at NHS Grampian from the week beginning the 23rd of March and for the 7 weeks thereafter. This particular time point was used as the UK entered the 'lockdown phase', placing many implications on NHS service

delivery.

Patients' records were reviewed retrospectively and the data collected included patients age, type of surgery performed (breast conserving surgery (BCS) vs Mastectomy) and hospital site. Patients with BCS were categorised into either simple wide local excision (WLE) or therapeutic mammoplasty (TM). For BCS patients, we looked at whether localization was required or not, the type of localisation used (standard wire or RF tag technique), day of insertion of device and the order of theatre list. When planning our theatre lists, patients that needed wire localization received it in the afternoon part of the list, as the wires are inserted at the main hospital on the day on surgery by our radiology colleagues. By the time the procedure is done, the check mammogram is performed and checked, the TC-99 is injected and the patient is transferred to BMI Albyn hospital it is already midday.

For the patients that had a RF tag inserted we looked at whether their surgery would have been able to go ahead on that day had they not had that type of localization as all the RF tags were inserted a week or more prior to surgery.

Results

Overall, 85 patients were listed on 29 theatre lists in the 7-week period. All patients were female with a median age of 59 years (33-90). Out of the 85 patients listed for surgery, 83 patients had operations, 28 patients (34%) at ARI and 55 patients (66%) at BMI Albyn hospital. The two patients cancelled were both BMI Albyn patients; the first was thought to be borderline conservable initially and the operating surgeon discussed neoadjuvant endocrine therapy to downstage her, while the second was postponed as her husband displayed symptoms of Covid-19 infection.

Among the patients, 11 had re-excisions of margins from previous BCS and 72 had their first breast surgery +/- axillary surgery; 18 out of 72 procedures were simple mastectomies (25%) and the remaining procedures were BCS; 11 out of the 54 BCS (20%) were therapeutic mammoplasties and 43 had simple WLE +/- glandular mobilization; 40 out of the 54 breast conserving procedures needed localization (74%) while 14 were palpable; 13 were localized using wires inserted on the day of surgery and 27 were RF tag guided inserted days in advance.

Out of the 27 that had RF tag localization, 20 would not have been able to have had their surgery that day had it not been for the tag. This is due to logistical issues presented by the alternative of wire localization which requires radiology cover and factoring in timing for this and also TC-99 injection at ARI. If the RF tag had not been in place prior to the day of surgery, the patient would have had to be on an afternoon list and with the case mix of predominantly impalpable breast cancers, this would have left



morning lists underutilized and patients incurring a delay in their surgery.

Discussion

The Covid-19 pandemic has had significant worldwide impact, exacerbated in many situations by lockdowns and the continuing of only essential services. This has had a drastic effect on all aspects of health care services with a reduction and in many cases cancelling of elective surgery to accommodate an overwhelming number of unwell patients. Unsurprisingly, this has also impacted on cancer services.⁹ A 'new normal' has emerged, resulting in creative new ideas and ways of working to deliver safe and efficient services. Minimising face to face consultations and the resultant decrease in hospital footfall with the use of phone and/or video appointments, planning workspaces and clinic flow to allow for social distancing and the introduction of protocols based on the latest and continually emerging evidence are all examples of how units have had to change.^{2,3}

In our unit, all surgeons were already trialling RF Tags as a new localisation technique prior to the Covid-19 lockdown and feasibility for this was established quickly. Our unit is one of the first units in the UK and Europe to adopt this, with the first European cohort published only earlier this year.⁸ The need to move most of the breast cancer surgery to a cold site stipulated a fast up-scaling of this as it gave us the flexibility and enabled us to accommodate sudden changes of dedicated theatre days, to adapt to short notice cancellations and to efficiently plan theatre lists. The RF tags were inserted days and sometimes weeks before surgery providing the freedom of placing patients at any order of a theatre list at short notice on any day of the week. Re-deployment or shortage of radiology staff on the day of surgery was not of any concern as RF tags were implanted in the breast days before surgery. This also provided an opportunity to review the position of the tag in relation to the impalpable lesion on check mammograms and to discuss issues with the breast radiologist.

As demonstrated in the results section, three quarters of the patients that had their first cancer operation had BCS, the majority requiring localization. Due to logistical constraints around radiology cover and timing, half of the patients needing localisation would not have been suitable for surgery on their scheduled day. While they would ultimately have had a traditional wire localization (on the day of surgery), this would have been at a later date with the risk of further cancellation depending on staffing levels. The RF tag enabled the most efficient use of staff and service time.

In conclusion, the use of RF tags in the localization of impalpable breast lesions offers several benefits to patients, clinician and the

healthcare service provider. They give the flexibility to theatre list timing and location that cannot be assured with traditional wire localization. In our experience, fast-tracked by the Covid-19 pandemic, RF tag insertion is a suitable alternative localisation technique. More prospective studies are required to allow adequate comparison to other localisation devices.

Acknowledgments

The authors would like to thank Friends of Anchor for their generous grant that enabled the trial of RF tags in Aberdeen, and all the staff in the Unit at Aberdeen Royal Infirmary and BMI Albyn Hospital for making this possible.

Conflict of Interest

None.

References

1. The UK National Institute of Health and Care Excellence. COVID-19 rapid guideline: delivery of systemic anticancer treatments. 2020.
2. Association of Breast Surgery Statement re Covid [press release]. 27th of April 2020.
3. Dietz JR, Moran MS, Isakoff SJ, Kurtzman SH, Willey SC, et al. Recommendations for prioritization, treatment, and triage of breast cancer patients during the COVID-19 pandemic. the COVID-19 pandemic breast cancer consortium. *Breast Cancer Res Treat.* 2020;181, 487–497.
4. Frank HA, Hall FM, Steer ML. Preoperative localization of nonpalpable breast lesions demonstrated by mammography. *N Engl J Med.* 1976;295(5):259-60.
5. Milligan R, Pieri A, Critchley A, Peace R, Lennard T, et al. Radioactive seed localization compared with wire-guided localization of non-palpable breast carcinoma in breast conservation surgery—the first experience in the United Kingdom. *Br J Radiol.* 2018;91(1081):20170268.
6. Zacharioudakis K, Down S, Bholah Z, Lee S, Khan T, et al. Is the future magnetic? Magseed localisation for non palpable breast cancer. A multi-centre non randomised control study. *Eur J Surg Oncol.* 2019;45(11):2016-21.
7. McGugin C, Spivey T, Coopey S, Smith B, Kelly B, et al. Radiofrequency identification tag localization is comparable to wire localization for non-palpable breast lesions. *Breast Cancer Res Treat.* 2019;177(3):735-9.
8. Wazir U, Tayeh S, Perry N, Michell M, Malhotra A, et al. Wireless Breast Localization Using Radio-frequency Identification Tags: The First Reported European Experience in Breast Cancer. *In Vivo.* 2020;34(1):233-8.
9. Al-Shamsi HO, Alhazzani W, Alhurajji A, Coomes EA, Chemaly RF, et al. A Practical Approach to the



Management of Cancer Patients During the Novel Coronavirus Disease 2019 (COVID-19) Pandemic: An International Collaborative Group. *Oncologist*. 2020;25(6):e936-45.