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ORIGINAL ARTICLE

The management of radial scars of the breast - does core biopsy help?

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Summary

Purpose: *To compare the effectiveness of fine needle aspiration cytology (FNAC) with core biopsy (CB) in the pre-operative diagnosis of radial scar (RS) of the breast.*

Patients and methods: *A retrospective analysis was made of all radial scars diagnosed on surgical histology over an 8-year period. Comparison was made between the results of different preoperative needle biopsy techniques and surgical histology findings.*

Results: *Forty of 47 patients with a preoperative radiological diagnosis of radial scar were included in this analysis. Thirty-eight patients had impalpable lesions diagnosed on mammography and two presented with a palpable lump. FNAC (n=17) was inadequate in 47% of patients, missed two co-existing carcinomas found in this group, and gave a false positive or suspicious result for malignancy in 4 patients. CB (n=23) suggested a RS in 15 patients, but only diagnosed 4 out of 7 co-existing carcinomas found in this group.*

Conclusion: *CB is more accurate than FNAC in the diagnosis of RS. However, these data demonstrate that CB may offer little to assist in the management of patients with RS. In summary, this paper advocates the use of CB in any lesion with a radiological suspicion of carcinoma and diagnostic excision of all lesions thought to be typical of RS on mammography.*

Key words: breast, breast neoplasms, diagnosis, radial scar

Introduction

Radial scars or complex sclerosing lesions are benign lesions predominantly detected by screening mammography. They are usually surgically excised because it is difficult to differentiate RS from small carcinomas radiologically. In addition, a proportion of RS are associated with *in situ* or invasive carcinoma [1] and in these patients further surgery is often necessary to achieve complete tumour clearance and, in invasive disease, to stage the axilla.

In the last 10 years image-guided core biopsy (CB) has become an established part of breast diagnosis. Although FNAC is still undertaken extensively, there is increasing reliance on CB [2]. Published data show advantages of sensitivity and specificity of CB over FNAC [3]. CB also gives useful information regarding tumour grade, hormone receptor status, and whether invasive or *in situ* disease is present. CB, however, is associated with a small number of false negative and very occasionally false positive results.

Current management advocates surgical excision of all suspected RS to confirm the diagnosis and to detect any associated premalignant or malignant change. This paper evaluates the value of needle biopsy, and in particular CB, in the diagnosis of RS.

Patients and methods

A retrospective review was performed on 47 cases of RS diagnosed in our institution between 1991 and 1999. This material includes 43 patients with mammo-

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graphic abnormalities detected within the National Health Service Breast Screening Programme (NHSBSP) and 4 patients seen in the symptomatic clinic, 2 with palpable lesions and 2 with incidental mammographic findings. Patients with incidental microscopic RS on histology following routine excision biopsy for benign disease were excluded from this study. The results of preoperative assessment by FNAC or CB were recorded. CB technique, including the method of image guidance, needle gauge and the number of passes were noted. The needle biopsy results were compared with the final histology following excision biopsy. The contribution made by CB to patient management was evaluated.

Results

Among the 47 patients reviewed (mean age of 54.5 years), 45 had impalpable lesions and two patients presented with a palpable lump. Five patients had no preoperative FNAC or CB and 2 patients declined surgery, leaving 40 for further study. Seventeen of these patients had FNAC and 23 patients had CB preoperatively. The mammographic appearances of the 40 lesions are outlined in Table 1. The predominant feature was either a spiculated mass or parenchymal deformity in 31 (77.5%) of 40. Four had mainly microcalcification and a mass was present in 3 patients. In two patients who presented with a palpable mass, the mammogram was normal but both lesions were visible on ultrasound (US).

The final histology showed a benign RS with no atypia or malignancy in 28/40 (70%) patients. The following pathological features were associated in the remainder: invasive ductal carcinoma (n=2, 5%), ductal carcinoma *in situ* (DCIS) (n=4, 10%), lobular carcinoma *in situ* (LCIS) (n=3, 7.5%) and atypical ductal hyperplasia (ADH) (n=3, 7.5%). The results are summarised in Table 2.

In the FNAC group (n=17) 8 (47%) were inadequate (C1, category), 4 were benign (C2, 23%), one was suspicious probably benign (C3, 6%), 3 were suspicious probably malignant (C4, 18%) and one was malignant (C5, 6%). On final histology there was one invasive carcinoma in this group (FNAC - C1) and one DCIS (FNAC - C2). Among 4 patients in whom the FNAC was reported as C4 or C5, 3 had benign RS without atypia and one had associated ADH.

In the CB group (n=23) 18 (78%) were reported as benign with no atypia, one (4%) had ADH, one (4%) had LCIS and 3 (13%) had DCIS. Core biopsy suggested RS as the likely diagnosis in 15 out of 23 patients (65%). On final histology 13 of 18 (72%) benign cores proved to be RS without atypia or malignancy; the other 5 patients had ADH (n=2, 11%), LCIS (n=1, 5.5%), DCIS (n=1, 5.5%) and invasive cancer (n=1, 5.5%). CB was accurate in 2 of 3 patients with DCIS. In one patient the core suggested DCIS but the final diagnosis was LCIS.

The method of biopsy for FNAC is displayed in Table 3a. A more detailed analysis of the method of CB is shown in Table 3b. Nine (39%) of the lesions could be seen using US and this was the preferred method of CB. For lesions that could not be seen on US or where US was not performed, stereotactic – n = 12 (52%) –

Table 1. Dominant mammographic appearances of radial scars (n=40)

Mammographic appearances	*Number of patients (%)*
Spiculated mass	16 (40)
Parenchymal deformity	15 (37.5)
Microcalcification	4 (10)
Mass	3 (7.5)
Normal*	2 (5.0)

*both presented with breast lumps that were mammographically occult but demonstrated on ultrasound

Table 2. Correlation between needle biopsy and surgical histology results

*Final histology**	*FNAC (n=17)*					*Core Biopsy (n=23)*					
	C1	*C2*	*C3*	*C4*	*C5*	*Inadequate*	*benign*	*ADH*	*LCIS*	*DCIS*	*IC*
Benign RS	7	3	1	2	1	–	13	1	–	–	–
RS with ADH	–	–	–	1	–	–	2	–	–	–	–
RS with LCIS	–	–	–	–	–	–	1	–	1	1	–
RS with DCIS	–	1	–	–	–	–	1	–	–	2	–
RS with IC	1	–	–	–	–	–	1	–	–	–	–

FNAC: fine needle aspiration cytology; RS: radial scar; ADH: atypical ductal hyperplasia; LCIS: lobular carcinoma *in situ*; DCIS: ductal carcinoma *in situ*; IC: invasive carcinoma

*In the case of several pathological conditions being associated with the RS, only the worst prognosis lesion was considered; e.g., a lesion containing both DCIS and LCIS is presented as DCIS

Table 3. Methods of biopsy

3a. FNAC (n=17)

Method of biopsy	*n (%)*
Ultrasound	8 (47.1)
Alphanumeric plate	5 (29.5)
Stereotactic	3 (17.6)
Palpation	1 (5.8)

3b. Core biopsy (n=23)

Method of biopsy	*n (%)*	*Gauge*			*Number of passes*	*Complete histological correlation* n (%)*
		14G	*16G*	*18G*	*Mean (range)*	
Stereotactic	12 (52)	9	1	2	7.9 (6-10)	9 (75)
Ultrasound	9 (39)	1	8	0	2.6 (1-5)	6 (67)
Alphanumeric plate	2 (9)	2	-	-	5.0 (4-6)	1 (50)

*complete correlation between the core biopsy and final histology results

or alphanumeric plate – n = 2 (9%) – was used. The majority (89%) of US-guided biopsies were performed using 16 gauge needles, with a mean of 2.6 passes per procedure. Larger gauge needles with more frequent passes tended to be used for stereotactic-guided biopsies. In 75% of biopsies 14 gauge needles were used, with an overall average of 7.9 passes. There was complete correlation between the CB results and the final surgical histology in 9 of 12 (75%) of stereotactic-guided biopsies and in 6 of 9 (67%) of US-guided biopsies.

Discussion

These results suggest that FNAC has limited value in the preoperative assessment of RS in keeping with two previous studies [1,4]. The high inadequate rate (C1, 47% in this study) confirms an earlier study [5], and is partly due to the fibrous nature of the lesion [6]. Furthermore, FNAC often misses associated carcinoma [1,5] and both cancers in the FNAC group in this study (one invasive and one DCIS) scored C1 and C2, respectively. Of potentially greater clinical hazard is the single false positive FNAC (C5) with benign RS, which might have resulted in inappropriate cancer surgery. Such false positive FNAC results have previously been described in patients with RS [1,6,7].

This study clearly demonstrates that CB is superior to FNAC in the diagnosis of RS. We have therefore evaluated the extent to which CB affects the management of patients with RS. In this series there were 2 patients who had associated DCIS diagnosed preoperatively. These patients were able to undergo adequate wide local excision of their malignancy at a single operation rather than undergoing an initial diagnostic surgical excision. The disadvantages of performing CB in all patients include the time, effort, expense and patient discomfort when attempting to biopsy lesions that are frequently challenging to image. In addition there was one false positive CB diagnosis of DCIS in this series that was downgraded to LCIS on subsequent surgical excision. There were 2 cases of associated malignancy where the CB diagnosed benign RS only. Both these patients required second operations for definitive cancer treatment.

An alternative strategy is to consider surgical excision of all RS diagnosed on imaging without a preoperative needle biopsy. In our series potentially 23 unnecessary needle biopsies with their attendant discomfort and expense would have been avoided. One false positive patient diagnosed as having DCIS on needle biopsy would have undergone excision biopsy rather than wide excision. False positive results with CB are exceedingly uncommon. There has been one additional false positive case reported under similar circumstances where a CB diagnosis of tubular carcinoma was found to be due to benign RS following surgery [8]. Four patients in our series would have required additional therapeutic surgery (3 DCIS, 1 invasive carcinoma). Two of these additional operations would have been avoided by the preoperative core biopsies diagnosing their associated DCIS.

Therefore, in this series of 23 patients undergoing core biopsy, if all presumed RS underwent surgical excision without previous biopsy, a total of 27 operations would be necessary, 4 patients with malignancy having to undergo subsequent cancer surgery. This is comparable to 25 operations required for all patients if each had preoperative core biopsies as is the case in our institution. These 2 additional operations need to be offset against the expense and time to perform the 23 core biopsies and the potentially unnecessary surgery that the patient with an erroneous DCIS diagnosis may have undergone.

Although CB substantially outperforms FNAC in diagnosing RS, it actually contributes little in changing the management of patients with this condition. The main problem relates to distinguishing RS from carcinoma on radiological grounds only. If carcinoma is thought to be a distinct possibility following mammography, then core biopsy should be performed, as this will reduce unnecessary second operations. As a result, CB will be performed in a proportion of patients with RS.

Is there any way therefore to maximize the information obtained from the needle biopsy? In our series there was a trend to more accurate needle biopsy/surgical histology correlation when a greater volume of tissue (larger gauge needles and more passes) was removed. This would concur with the findings of a previous study that demonstrates a closer correlation between needle biopsy and subsequent surgical specimens when vacuum-assisted biopsies (VAB) are used [9]. This is further illustrated by reduced upgrading following a VAB diagnosis of benign conditions, such as atypical ductal hyperplasia, to DCIS when compared with CB [9-11]. If all suspected RS underwent VAB, with a presumed increase in the diagnosis of associated malignancy, the number of additional operations may be reduced. This would, however, have to be offset against the considerable additional expense of VAB over CB.

In summary, we would advocate the use of CB in any lesion with a radiological suspicion of carcinoma. Our data show that CB may offer little to alter the management of patients with RS. It is unreliable at detecting associated malignancy and so will reduce some, but not all, of the need for additional cancer surgery. If RS is suspected then the greater the volume of tissue removed the more reliably should associated malignancy be detected.

At present therefore we would advocate diagnostic excision of all lesions thought to be typical of RS on mammography. If mammography is suspicious of malignancy CB should be performed. This strategy may be more cost-effective whilst we await the accrual of more data on the efficacy of VAB in the diagnosis of RS.

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