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Performance of breast lesion excision system (BLES) in complete removal of papillomas presented mammographically as groups of calcifications

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ABSTRACT

Objectives: To retrospectively assess the stereotactic one-pass BLES performance in excision of small groups of calcifications seen on mammogram that proved to be papillomas.

Methods: Between January 2014 and January 2016, 37/400 cases (9.2%) of stereotactic BLES biopsies performed in our department due to suspicious calcifications proved to be papillomas. Lesions with atypia underwent surgical removal and lesions with no atypia were followed up for 2 years. BLES and surgical histology results, radiological removal and 2-years stability were statistically analysed to assess BLES performance in biopsy and excision of papillomas.

Results: The mean mammographic size of papillomas was 6.54 mm (st dev = 3.85, range 2 mm − 17 mm) and within the size excised by the BLES needle (20 mm). 4/37 cases (10.8%) showed atypia. BLES excision was achieved in 29/37 cases (78.4%); radiological removal based on post BLES mammogram was achieved in 25/29 cases (86.2%). In the remaining 8/37 cases the papillomas were seen at the ink of the specimens' margins; 3/8 cases showed residual calcifications on post-BLES mammogram. The BLES histology result of removal and the mammographic size of the papillomas were found to be statistically significant predictive factors of excision ($p < 0{,}001$, Fisher's exact test, Mann Whitney test). Follow up mammograms showed no change for a period of 2 years.

Conclusion: BLES is a safe and accurate technique to biopsy papillomas with high success rates of excision which could potentially minimize the need of subsequent radiological or surgical excision.

1. Introduction

Benign papillary lesions are epithelial lesions with or without cell atypia and histopathologically comprise a broad spectrum of findings such as intraductal papilloma, papillomatosis, atypical papilloma or atypical papillomatosis [1,2]. Papilloma is a relatively frequent finding on breast pathology results, accounting for 4% to 5% of breast core biopsies [3–5]. The literature reported upgrade rates of atypical papillomas diagnosed on core needle biopsies (CNB) or vacuum assisted biopsies (VAB) vary from 0% to 28% in surgical excision samples [6–8]. There is also evidence that the risk of upgrading to cancer is increased with atypical papillomas [9,10]. Several studies have been conducted showing that after VAB there is no upgrade to cancer of papillomas with no atypia [11,12].

The current recommendations regarding benign papillomas found on CNB is to completely remove papillomas without atypia, either by surgery or VAB due to the heterogeneity of papillary lesions and the pathology difficulties in excluding malignancy with small tissue samples at CNB [13]. Also, recent studies have shown that apart from the presence of atypia, the large size of the papilloma (over 15 mm) and the presence of clinical symptoms of the patients are criteria to support surgical excision [12,14].

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Histopathologically, the presence or not of a continuous basally-oriented myoepithelial cell layer is the key to distinguish between benign, atypical and malignant papillary lesions and it is often challenging for pathologists to interpret this finding in fragmented sample tissues following core needle biopsies or vacuum assisted biopsies [15].

The Intact breast lesion excision system (BLES) is an automated vacuum-assisted single-pass biopsy device that uses radiofrequency under stereotactic guidance, allowing monobloc excision of breast lesions. BLES is a biopsy technique that excises an intact spheroid tissue specimen from the breast and thus provides better histopathological evaluation of the architecture of the breast tissue and also margin evaluation of the specimen [16–18].

Recent studies have been shown that BLES device can be used as a treatment tool for benign breast lesions including papillomas with promising results [19].

The aim of this study is to evaluate the role of one pass stereotactic BLES biopsy in management and treatment of benign papillomas presenting as clusters of microcalcifications on mammogram avoiding a subsequent surgery or second VAB excision.

2. Methods and materials

This is a single-centre retrospective study conducted in our breast unit. Between January 2014 and January 2016, 394 patients (mean age 58.5 years old; range from 39 to 78 years old) underwent stereotactic breast biopsy using the intact breast lesion excision system (BLES). The biopsy equipment is consistent of the Fischer digital stereotactic device (Mammotest, Fischer Imaging) and the BLES device (Breast Lesion Excision System® -B.L.E.S.- Intact Medical).

The main indication was suspicious groups of calcifications found on mammogram from external referral. A total number of 400 groups of suspicious calcifications were biopsied using the BLES device during that period. 37 of these cases proved histopathologically to be benign papillary lesions and data were collected from our records for further analysis. Informed consent for the percutaneous biopsy was obtained from all patients and ethical approval for the conduction of the study was also obtained.

Contraindications to BLES biopsy were mainly: small breasts with thickness at compression < 30 mm, implants in situ, the positioning of the target lesion deep to the fascia or close to the skin, pregnancy and cardiac pacemakers.

Inclusion criteria for this retrospective analysis were: a) all benign papillary lesions that were stereotactically biopsied with the BLES device (n = 37), b) only first BLES biopsies were included in this study, c) all cases were expressed as groups of calcifications on a screening mammogram and patients had no symptoms, d) all cases were not palpable on clinical examination. The BLES histopathology result (n = 34) and the subsequent surgical result (n = 3) were used as gold standard. 2-year mammographic follow up was also assessed in all cases.

The age, the BI-RADS classification and the side of the biopsy were recorded. The mammographic size of the calcifications, the histology size of the papillary lesion, the shortest distance of the lesion from the specimen margins, the post BLES mammographic absence of calcifications (radiological removal), the surgical result and the 2-year mammographic follow up were also recorded and statistically analysed.

Pain and comfortable positioning were evaluated with a verbal rating scale (VRS, from 0 to 10) after the BLES procedure.

All patients proven to have benign papillary lesions who did not undergo subsequent surgery, had an initial post-BLES follow up with clinical examination and 2 views mammogram at 6 months. All patients with benign papillary lesions regardless of whether they had complementary surgery or not, had 2-year follow up with an annual mammogram according to the protocol of our department.

2.1. BLES procedure

All BLES biopsies were performed with a 20 mm probe. The probe is mounted into a handle that contains a motor and a drive mechanism that activates the mechanics of the capture basket. Because the device employs a radiofrequency (RF) tissue cutting mechanism, a patient return electrode is applied to the upper back on the contralateral side of the breast to be biopsied.

The Intact® BLES probe used in this study employs an RF capture snare to harvest the biopsy specimen. The snare is mounted on the distal end of a basket that expands to a maximum diameter and then contracts to isolate the specimen tissue from the rest of the breast. The probe uses an RF cutting mechanism to navigate through the breast tissue and to harvest the specimen.

Initial stereotactic localization of the targeted area was performed by the radiographer under the supervision of the radiologist. The procedures were performed by two experienced radiologists.

The patients were placed in a prone position. Cutaneous and breast local anaesthesia was performed according to our guidelines around the lesion in 12, 3, 6 and 9 o'clock positions. The amount of local anaesthetic (lidocaine 2%) used was 20 ml and a delay of at least 5 min was required between anaesthesia and the beginning of the biopsy procedure for acceptable local anaesthesia.

During this period, a control mammographic view of the location of the target was performed because of frequent shifts of the target (1–10 mm) due to the amount of anaesthetic solution injected. An 8-gauge probe was used for the stereotactic biopsies. After the biopsy completion a clip marker was positioned in the cavity through the biopsy channel in all cases.

Radiographic image of the removed specimen was performed in all cases to assess the presence of the target lesion-calcifications. The sample was placed in formalin and sent to the Pathology Department for histopathologic assessment.

After completion of the excision, external compression was applied on the incision site for at least 5 min for haemostasis. The incision site was dressed with steri-strips and compressive bandage was applied.

Post procedure mammogram was performed in all patients to show the biopsy cavity (usually as a small round or ovoid air-space area at the site of the biopsy), the achievement or not of radiological removal of the group of calcifications, the correct placement of the clip marker within or close to the cavity/biopsy site and any immediate complications such as haematoma.

All patients had a control post procedure follow up 48 h after the biopsy to check the healing of the incision and deal with any complications, such as haematoma or infection.

2.2. Histopathology analysis

Papillary lesions and their various subtypes were reported by experienced pathologists on an official pathology report form. Measurement of the size of the BLES specimen and inking of the margins of the specimen were performed. The size of the papillary lesion, the presence and the type of cell atypia and the distance from the margins in mm were mentioned in all pathology reports. Whether the lesion was found at the ink of the margin (distance from the margins 0 mm) of the specimen or was completely included in the specimen (completely removed) was also mentioned.

Coexisting benign findings, such as fibroadenomas or fibrocystic changes, were also mentioned, when present.

Thermal artefacts if present and significant for the pathology diagnosis, were also acknowledged in the final report.

The histopathological analysis of the cases with subsequent surgical resections identified and reported the previous BLES biopsy cavities in all cases.

2.3. Statistical analysis

The mean values and the respective standard deviations were used to describe scale measurements such as the mammographic size of the calcifications and the clear margins in mm, while frequencies and percentages were used for categorical variables such as the surgical results and the BIRADS classification.

The Mann Whitney test was used to assess correlations between complete removal or not of papillomas and the initial mammographic size, the post BLES radiological removal (mammographic presence or absence of calcifications) and the age of the participants. The association between the distance of the lesion from the tissue margins and the pathologists' confirmation of complete removal was assessed with the Fisher's exact test.

All analyses were carried out with the use of the SPSS v22.0 Software (Armonk, NY: IBM Corp). Statistical significance was set at 0.05 in all cases.

3. Results

In 37 out of 400 (9.25%) BLES biopsies that were performed between January 2014 and January 2016 in our Department due to suspicious groups of calcifications the histopathology result was positive for benign papillary lesions. The mean age of the target group was 55 years old (st dev. = 10.55). In all cases a single group of calcifications was present within the breast. The imaging characteristics of the groups of the calcifications were fine amorphous in 31/38 cases (81.5%) and coarse heterogeneous in 7/38 cases (18.4%). Two of our cases had bilateral groups of calcifications and the contralateral group of calcifications turned out to be benign non-proliferating fibrocystic changes in both cases; thus, single benign papillary lesions were found in all cases included in the study.

The mean mammographic size of the group of the calcifications was 6.54 mm (st. dev: 3.856, range: 2 mm to 17 mm). In all cases the diameter of the calcifications was within the size that the BLES probe used can potentially excise (20 mm).

From the total of 37 papillomas 4 were found to include atypical features (10.8%); all 4 showed atypical epithelial hyperplasia (ADH) and two of them showed additional coexistence of flat epithelial atypia (FEA) in the surrounding tissue. From these 4 atypical papillomas 3 had subsequent surgery. The remaining 33 papillomas showed no atypical features and were mainly central intraductal papillomas. In only one case a peripheral papilloma was observed (Table 1).

According to the histopathology reports 25/33 (75.7%) benign papillomas with no atypia were completely removed and totally included in the pathological specimen. All 3 papillomas with atypia that had subsequent surgery showed no residual disease in the surgical specimen; thus, were also completely removed with the initial BLES biopsy. The histopathology report of the BLES specimen showed that all 3 were totally included in the tissue specimen with clear specimen tissue margins in all cases (2 mm in one case and 0.5 mm in the remaining 2 cases). The fourth case of atypical papilloma that did not have complementary surgery was also completely included in the tissue specimen with clear margins of 0.5 mm.

Figs. 1–4 illustrate the achievement of complete removal of intraductal papillomas.

Table 1
Occurrence of papillomas in our population.

Lesion type	Number	BI-RADS	Mean mammographic size
Benign intraductal papillomas	32	4A	8.5 mm (2 mm–17 mm)
Atypical papillomas	4	4A	3.5 mm (2 mm–10 mm)
Peripheral papillomas	1	4A	4 mm
Total	37	4A	8.5 mm (2 mm–17 mm)

According to our results, the rate of complete removal of all papillomas with and without atypia, was 78.4% (29/37 cases), and we removed all three cases of atypical papillomas that underwent subsequent surgery (3/3 cases) (Table 2).

In 22/29 (75.8%) cases of complete removal there was concordance between the initial mammographic size of the calcifications and the histopathology size of the papilloma and no calcifications were noted in the post-BLES biopsy control mammogram. In the remaining 7/29 (24.1%) cases of complete removal, the histopathology size of the papilloma was smaller than the initial mammographic size of the calcifications (ranging from 2 mm to 9 mm) and in all these cases a background of benign calcifications was mentioned in the histopathology report. In 4 of these cases residual calcifications were seen on the post BLES mammogram.

In 8/37 (21.6%) cases, lesion was found at the ink of the specimen (0 mm from the margins of the specimen). The mammographic size of these lesions was ranging from 3 mm to 12 mm. In 5/8 of these cases the initial mammographic size of the calcifications and the histopathology size of the papilloma were the same and no calcifications were noted on the post BLES mammogram. In the remaining 3 cases, residual calcifications were noted in the post-BLES mammogram (2 of them showed one single calcification and in the third case two calcifications were visible at the edge of the biopsy cavity). The mammographic size of the lesions with residual calcifications was 7 mm, 8 mm and 12 mm respectively. None of these cases underwent surgery and none of them showed any change in the 2-year follow up mammograms.

The correlation of the initial mammographic size of calcifications and the post BLES radiological removal is summarised in Table 3 and illustrated in Fig. 5.

In 30/37 cases no residual calcifications were noted in the post-BLES mammogram (81%). Concordance between the pathology report of complete removal and the radiological removal was achieved in 25/29 cases (86.2%). In the remaining 4 cases that calcifications were noted on the post BLES mammogram, the papilloma was completely excised with clear margins on the BLES pathology specimen and a background of benign calcifications was mentioned in the pathology report; thus, the residual calcifications were likely part of the background benign calcifications (Table 4, Fig. 6).

All cases had a clinical and mammographic follow up 6 months after the BLES biopsy, and then annual mammographic follow up for 2 years. All cases showed stability in the mammographic appearances during this period (no evidence of calcifications in 30/37 cases and unchanged calcifications in 7/37 cases).

Non parametric statistical analysis showed no statistically significant correlation between patients' age or BLES specimen size and the complete removal of the papillomas. No statistically significant correlation was found between the mammographic size and the BLES specimen lesion size, and the achievement of complete removal (Pearson Chi-Square, $p = 0.157$). There was statistical association between the pathology report of complete removal and the distance of the lesion from the tissue margins. When the distance was over 0.1 mm, pathologists reported that a complete removal was achieved (Fisher's exact test, $p < 0.001$). There was also statistically significant correlation between the achievement of complete removal and the radiological removal (Mann Whitney test, $p < 0.001$). Statistically significant correlation was also found between the initial mammographic size of calcifications and the achievement of excision (Mann Whitney test, $p < 0.001$). The mean size for complete removal was 5.38 mm (st. dev. 2,290), which was significantly smaller than the mean size of lesions that were not completely excised (10.75 mm, st. dev. 5,445).

Evaluation of pain showed that the procedure was very well tolerated with median VRS score 2.1 (range 0–7), while the median VRS score regarding comfort during positioning for the procedure was 1.6 (range 0–5).

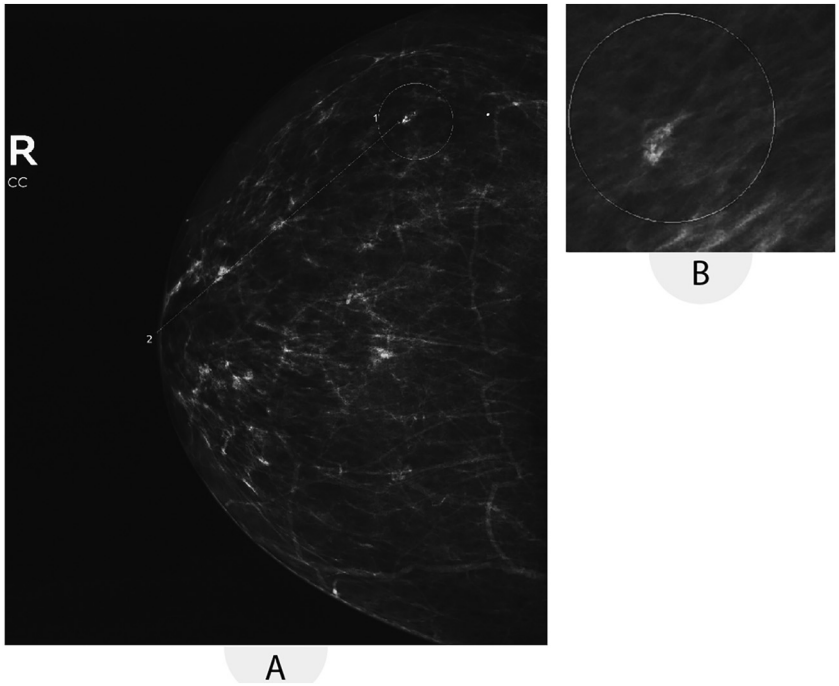

Fig. 1. A. Craniocaudal (CC) view of the right breast shows a small group of suspicious calcifications in the outer part of the breast (circle). B. Magnification view of the group of calcifications.

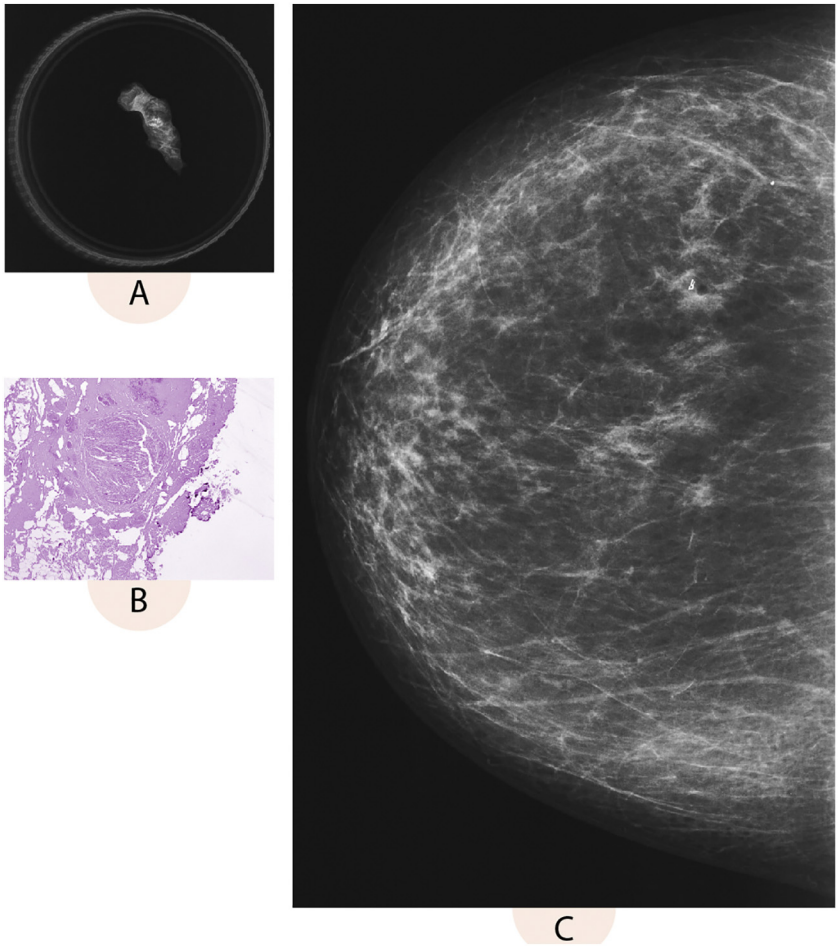

Fig. 2. A. X-ray of the BLES specimen shows that the group of the calcifications is included in the specimen. B. Histopathology image of the BLES specimen (magnification ×40) shows a benign papilloma with free-disease tissue margins. C. Post BLES CC view of the right breast shows the cavity of the BLES biopsy and the clip marker in place with no residual calcifications (radiological removal).

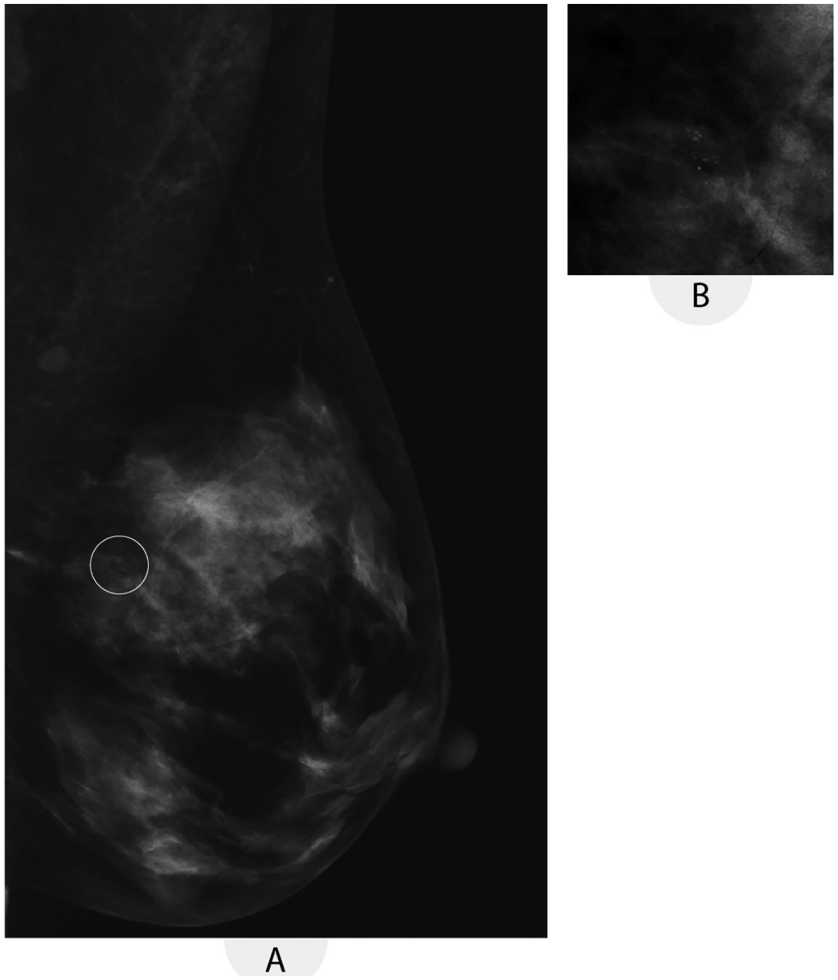

Fig. 3. A. Mediolateral (MLO) view of the left breast shows a small group of suspicious calcifications at the upper part of the breast (circle). B. Magnification view of the group of calcifications.

4. Discussion

According to our results, BLES is a feasible technique to excise small clusters of calcifications proved to be benign papillomas with high success rate (78.3%) minimising the need of subsequent VAB or surgical excision.

Papillary lesions show histopathologically a defining morphologic feature consisting of arborescent fibrovascular cores that support epithelial proliferation. The distinction is not always straightforward among the spectrum of intraductal papillary lesions, which comprise intraductal papillomas, papillomas with atypical ductal hyperplasia (ADH), papillomas with ductal carcinoma in situ (DCIS), and intraductal papillary carcinomas [20]. However, the management of benign and malignant papillary lesions is completely different so a definite diagnosis is essential. Surgery remains the only definitive treatment for malignant papillary lesions; on the other hand, the optimal management of benign papillary lesions remains under investigation. Current recommendations support that papillomas with no atypia can also be excised with VAB and surgery can be avoided, especially if they have a small size and they are not symptomatic [12–14].

However, even when using VAB for complete excision of benign papillomas, there is always a possibility that atypical cells or carcinoma cannot be excised, since coexistent atypia or carcinoma can sometimes be found in the surrounding tissue of the papilloma or at the edge of the papilloma. This is due to the lack of margins' assessment of the excised lesion using VAB as fragmented samples are removed and not a whole intact piece of breast tissue; thus, there might be cases where these lesions were not fully removed and residual tissue may contain atypical or carcinomatous cells. Also, this will require a second VAB to confirm the excision of the papilloma. The literature studies to date regarding vacuum excision of benign papillomas, include only small case series with short term follow up data [21,22]. In our study, we found 4 papillomas with atypia and in two of them an additional coexistence of atypia was found in the surrounding tissue. Additional benign findings were also found in the BLES specimen, such as fibroadenomas in 2 cases and fibroadenomatoid changes in one case.

The main advantage of the BLES technique is that a single ovoid piece of tissue is excised from the breast which is a micrograph of surgical excision. Pathologists can, thus, be confident that they have assessed the architecture of the breast tissue related to the included abnormality and the surrounding tissue, as well as the achievement or not of free margins by inking the margins of the excised tissue. We found that the clear margins over 0.1 mm was a statistically significant factor for the pathologists' report of complete removal. In our study 25/33 benign papillomas showed to be completely removed in the tissue specimen and 4/4 atypical papillomas also showed clear margins in the pathology BLES specimen. Complete removal was confirmed in all 3 cases of atypical papilloma that had subsequent surgery. In total, the success rate for complete removal was 78.3%.

Also, the need of second VAB excision or surgical excision to confirm the removal of the papilloma and the possible upgrade can be potentially minimised. In 78.3% of our cases a confident pathology diagnosis for excision of the papilloma was achieved in the first biopsy attempt of the calcifications. In 3 cases with additional surgery no

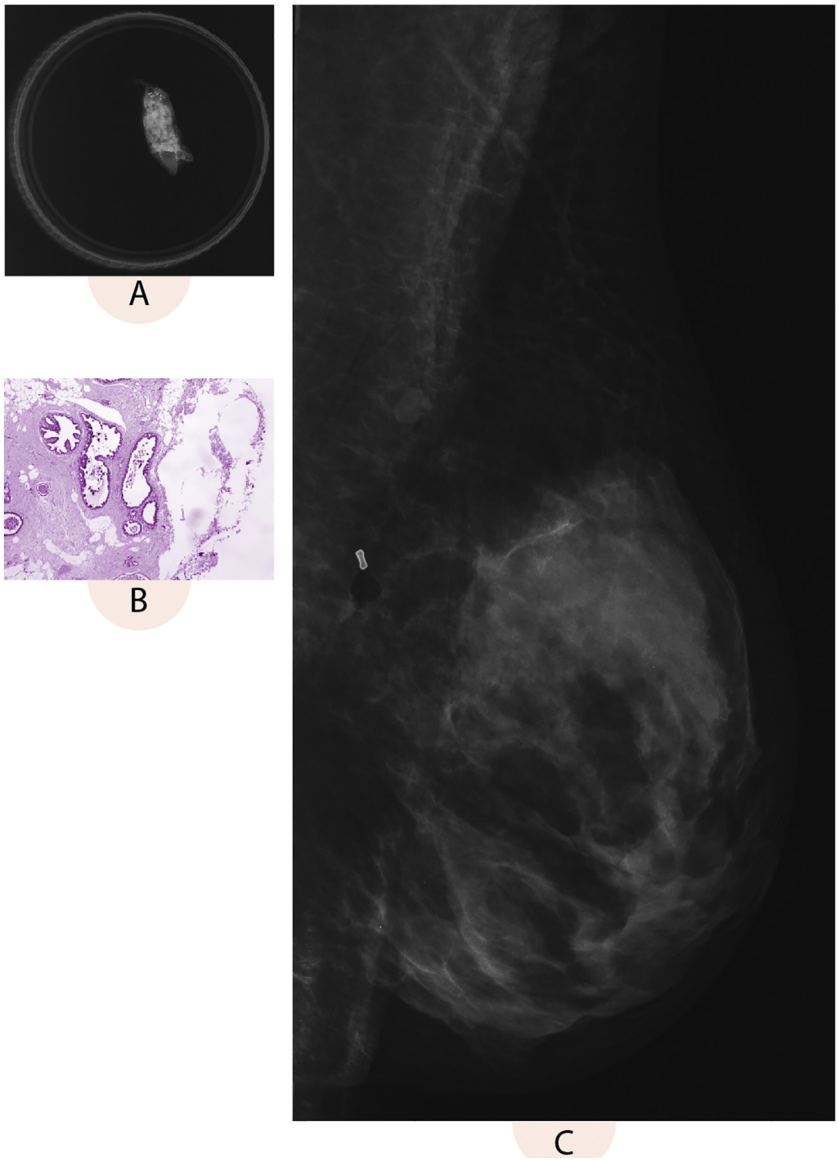

Fig. 4. A. X-ray of the BLES specimen shows that the group of the calcifications is included in the specimen. B. Histopathology image of the BLES specimen shows a papilloma with atypia (ADH) with free-disease tissue margins (magnification ×40). C. Post BLES MLO view of the left breast shows the post-biopsy cavity and the clip marker in place with no residual calcifications (radiological removal). The surgical result confirmed the absence of disease.

Table 2
Achievement of complete removal in benign and atypical papillomas of our population.

BLES result	Benign papillomas	Atypical papillomas
Complete removal	25	4
Lesion at ink	8	0

Table 3
Correlation of the initial mean mammographic size and the post-BLES radiological removal (yes/no).

Mammographic size (mm)			
Radiological removal	Mean	N	Std. deviation
Yes	5,18	28	2,389
No	10,78	9	4,577
Total	6,54	37	3,856

residual disease or upgrade was found in the surgical specimen; thus, in all of these cases (with or without atypia) the need of surgery or second biopsy to confirm the result was not necessary.

Radiology-pathology concordance is important to support removal of papillomas after VAB excision [13,14]. We found a statistically significant correlation between the achievement of excision and the radiological removal based on the post-BLES mammogram. In 86.2% of our cases no residual calcifications were found on the post biopsy control mammograms reassuring that the papilloma was completely removed. In the remaining 4 cases a background of benign changes with benign calcifications was mentioned on the pathology report. Also, in 5/8 cases that the lesion was found at the ink of the specimen no residual calcifications were found on the post biopsy control mammogram, suggesting that these lesions might have also been completely excised. Mammogram of the specimen tissue can be also assessed regarding the margins and the central positioning of the target lesion which theoretically suggests radiological removal. We performed one mammographic view of the specimen tissue in all of our cases to assess the presence of calcifications. However, we did not assess radiologically

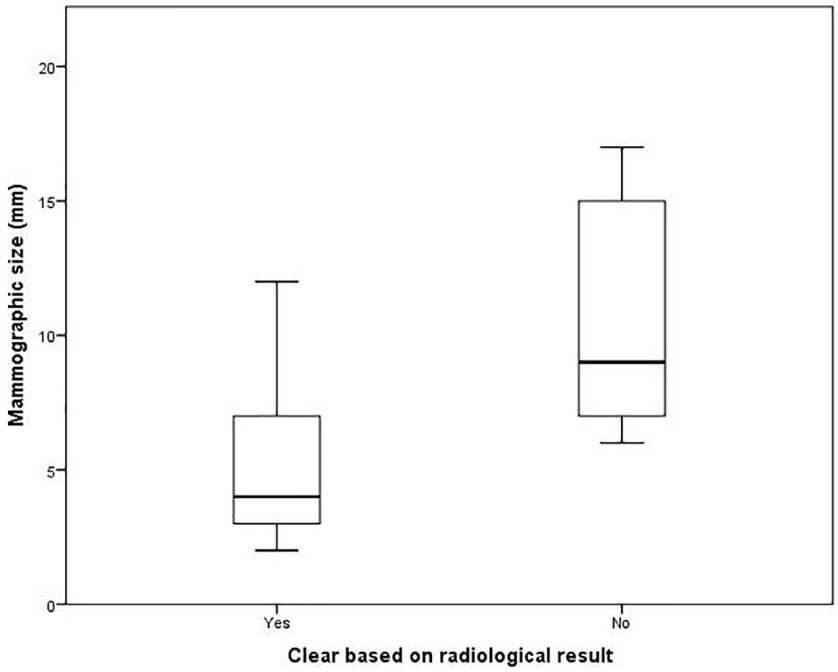

Fig. 5. Boxplots of the initial mammographic size (in mm) of the calcifications and the post-BLES radiological removal (clear based on the radiological result).

Table 4
Correlation between the pathology report of removal of the papilloma and the post BLES radiological removal (yes/no).

BLES result * post BLES radiological removal crosstabulation				
Count				
		Radiological removal		Total
		Yes	No	
BLES pathology removal	Yes	25	4	29
	No	3	5	8
Total		28	9	37

the margins of the specimens, mainly because it is difficult to assess the presence or absence of calcifications at the tissue margins based only on one view. Instead, we assessed the radiological removal on the post-BLES mammograms.

Another advantage of the BLES specimen is that the size of the papilloma can also be assessed and compared with the mammographic size. The size of the papilloma is important as previous studies have shown that larger than 15 mm papillomas should undergo surgical excision [14]. Although, in our study we did not find a statistically significant correlation between the mammographic size and the BLES pathology specimen size of papilloma, there was concordance in 22/29 cases of papillomas which were removed and in 5/8 cases of papillomas which were found at the ink suggesting that even in these cases a complete excision might have also been achieved. In the remaining 7/29 cases of papillomas which were removed the size of the papilloma was smaller than the mammographic size, ranging from 2 mm–9 mm. In the 3/8 cases that the papilloma was not completely excised the mammographic size was ranging from 7 mm to 12 mm; thus in all cases the size was smaller than 15 mm which has been previously suggested as the cut off size for excision [14].

The radiological size of the papillary lesions in our target group was small ranging from 2 mm to 17 mm and within the size that BLES needle could potentially excise. We found a statistically significant correlation between the size of the papilloma and the complete excision; the papillary lesions that were excised were statistically smaller than the lesions that found to be at the ink of the specimen. However, apart from the larger size, technical issues can also result in incomplete excision; patients' movement during the biopsy or technically difficult biopsy may result in incorrect targeting and thus failure of excision of the target-lesion. Also, the shape of the basket and thus the removed tissue may be a reason of failure; the removed tissue has a spheroid shape measuring around 20 mm in length and 10 mm in thickness -with the 20 mm basket used- and the included lesion cannot always be centrally positioned in the specimen resulting in failure of complete excision.

All of our cases were followed up for 2 years and show no radiological changes; no new calcifications were seen in our cases. Follow up mammograms show the clip marker close or at the site of the previously performed BLES biopsy. No scar or breast parenchymal deformity is visible at the site of the biopsy and absorption of the cavity is noted. In the cases of radiological removal apart from the clip marker no evidence of calcifications is noted at the site of the previous biopsy. In all the other cases, residual calcifications are noted on mammogram and should be assessed for stability. According to more recent recommendations benign papillomas could undergo close surveillance depending on the radiology-pathology and clinical correlation; mainly those with small size (< 15 mm), no atypia or clinical symptoms [13,14]. In our population none of the patients presented with symptoms and all of the cases found at the ink of the specimen with residual calcifications on post BLES mammogram were small (7 mm–12 mm) with no atypia.

Our results are in agreement with previous reported results regarding benign breast lesions expressed as groups of calcifications with high success rates of removal and low underestimations [23,24]. However, the sample of papillomas in these studies was small. We included 38 papillomas and we assessed the BLES performance as the initial therapeutic tool of these lesions. Also, our results are in agreement with previous reported results regarding BLES removal of biopsy proven benign papillomas [19]. However, in our study we assessed the method's performance in complete removal of papillomas at the time of the initial biopsy attempt with no previous proven biopsy. Also, we assessed only the stereotactic method of complete excision of papillomas expressed as groups of calcifications in correlation with the radiology-pathology result and not the method under ultrasound

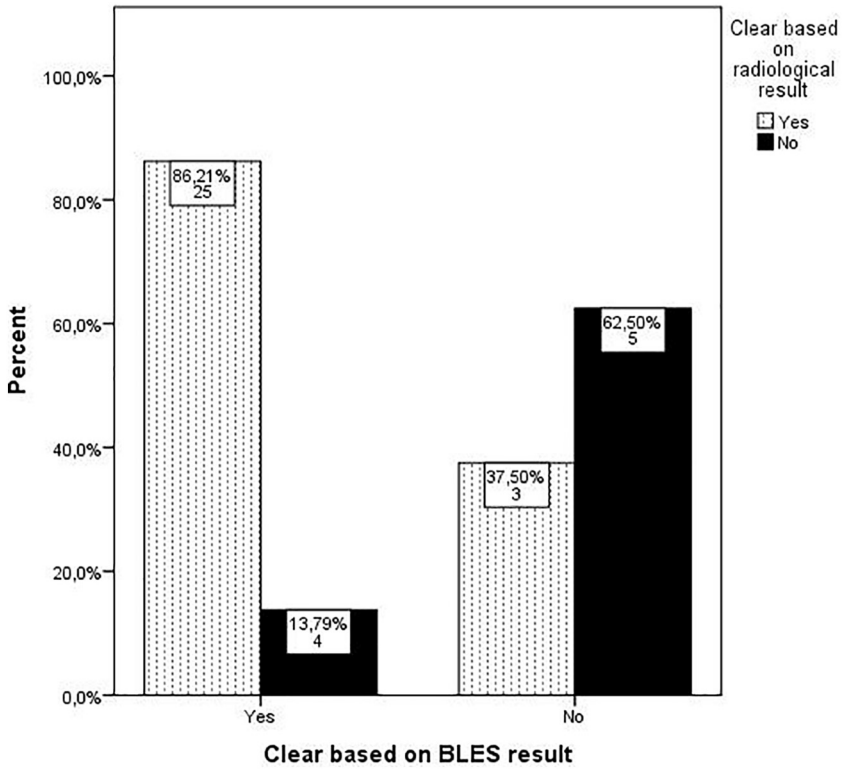

Fig. 6. Bar charts of the percentage of the cases that were completely removed (clear) according to the BLES pathology result and according to the radiological result (clear: absence of calcifications on the pot-BLES mammogram).

guidance.

The complications rate of BLES and VAB devices is similar in the literature [25,26]. We found no complications in our study. Although the skin incision is larger with the BLES device, as bigger needles are used (8 gauge), only minimal haematoma was seen in one of our cases which did not require drainage. Moreover, the BLES biopsy was well tolerated by all of our patients with a median VRS score of 2.1 for pain.

The limitations of our study are several. Firstly, only stereotactic BLES biopsies were included in the study. Papillomas found and biopsied under ultrasound guidance were not included. Secondly, only a few cases underwent surgery so we do not have surgical confirmation in most of our cases. Thirdly, the 2-year follow up period is relatively short. Fourthly, we did not assess radiologically the BLES specimen margins due to partial mammogram performed on the specimen (only one view of the specimen was taken). Finally, our sample size is relatively small and most of the cases were simple intraductal papillomas with only a few cases of atypical papillomas.

In conclusion, one pass stereotactic BLES biopsy is a safe, highly accurate and effective technique of biopsy and excision of small groups of calcifications proved to be benign papillary lesions minimising the need of subsequent radiological or surgical excision.

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