

Case Report

Diagnosis of Nonpalpable Breast Cancer Using Hematoma Localization Under Ultrasound Guidance In A Low-Resource Center. A Case Report.

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Abstract

Background: Ultrasound technology may bridge gaps in breast cancer detection and treatment in Africa. The lack of facilities for diagnosing and treating nonpalpable lesions is a significant obstacle to treatment of breast cancer in Africa. We report the successful use of Hematoma localization under Ultrasound Guidance with direct vision Excision (HUGE) to surmount some of the challenges of managing nonpalpable breast lesions in a low-resource center. HUGE is a modification of the Haematoma-Directed Ultrasound-Guided (HUG) breast biopsy. In HUG, magnetic resonance imaging identifies the lesion, and intraoperative ultrasound directs excision. A 26-year-old lady complained of bloody left nipple discharge of three days duration. Clinical review and sonography suggested fibroadenoma and nonpalpable intraductal papilloma. The cytology raised suspicion of malignancy, recommending excision. The nonpalpable lesion was localized by injection with autologous venous blood under ultrasound guidance and excised under direct vision using the HUGE technique. Histologic diagnosis returned as carcinoma in situ. Based on multidisciplinary team recommendations, the patient had a skin-sparing mastectomy with immediate reconstruction. The HUGE technique is a feasible and cheap modification of the HUG technique, which can support the management of nonpalpable breast tumours in low-resource centers where the facilities for mammography and magnetic resonance imaging are unavailable.

Keywords: Breast cancer (BC), Hematoma, Ultrasound guidance.

BACKGROUND

The lack of facilities for diagnosing and treating nonpalpable breast cancer is a significant obstacle to breast cancer treatment in Africa. The majority of breast cancer (BC) is diagnosed late in Africa, especially in sub-Saharan Africa (SSA), limiting treatment options and causing unsatisfactory outcomes. The broad array of breast-conserving treatments and the excellent outcomes of early breast

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cancer treatment in developed countries rely on the ability to detect, diagnose, and excise carcinoma in-situ, nonpalpable invasive tumors, and small clinically palpable invasive tumors. Ultrasound technology has the potential to improve the detection of small breast lesions^{1,2}, and aid less mutation in the treatment of BC in Africa.

The National Comprehensive Cancer Network (NCCN) harmonized guideline v4. 2021 for sub-Saharan³ recommends localized excision of nonpalpable breast tumors as a second-line option in SSA because the facilities for managing nonpalpable cancers such as preoperative magnetic resonance imaging, intraoperative ultrasound-guided or radio-guided biopsy techniques are not readily available.^{4,5,6}

This article reports a successful strategy to surmount some challenges of managing nonpalpable breast cancer in a low-resource center using regular ultrasound technology. This report presents the first successful detection, localization, diagnosis, and de-escalation of surgical treatment for nonpalpable breast cancer aided by Hematoma localization under Ultrasound Guidance for Excision (HUGE) technique. The HUGE technique described by Agodirin *et al*⁷ is a much cheaper and less technologically demanding modification of the Hematoma-Directed Ultrasound-Guided⁶ (HUG) breast biopsy technique. The HUG technique is available in technologically advanced centers only. In HUG, lesions are localized by injection with autologous blood under magnetic resonance imaging (MRI) and excised using intraoperative ultrasound guidance.⁶ Whereas, in the HUGE modification, lesions are localized by injection with autologous blood under ultrasound guidance and excised by unaided direct vision.⁷

CASE REPORT

Clinical Presentation

A 26-year-old unmarried, nulliparous adult female presented to the surgical outpatient clinic with bloody left nipple discharge for three days. She had no other local, regional or systemic symptoms. Her maternal grand-aunt had BC. There were no other significant findings in her history. The right breast and axilla were normal on clinical examination. There was spontaneous bloody nipple discharge on inspection of the left breast. Palpation revealed a discrete, freely mobile 2 x 1cm mass in the lower inner quadrant. There was no clinically palpable axillary lymph node. The provisional clinical diagnosis was fibroadenoma and intraductal papilloma. Breast sonography showed normal right breast and axilla. The left breast had two separate lesions. (1) A well-rounded lesion in the

lower inner quadrant reported as fibroadenoma. (2) An intraductal mass in the upper outer quadrant reported as intraductal papilloma. There was no sonographic evidence of left axillary lymph node enlargement.

Diagnosis Aided by Sonography and HUGE Technique

Fine-needle biopsy guided by ultrasound diagnosed the palpable lower inner quadrant mass as benign. The nonpalpable intraductal upper outer quadrant lesion was suspicious of malignancy, and open biopsy was advised.

The nonpalpable lesion was biopsied using the HUGE technique— an iatrogenic hematoma was created by injecting 4mls of the patient's venous blood into the lesion under ultrasound guidance. The iatrogenic hematoma (figure1) and the palpable lower outer quadrant mass were excised under direct vision 48hours later. There was no intraoperative imaging or technological support. Histology report of the lower inner quadrant palpable mass was diagnosed as complex fibroadenoma, and that of the nonpalpable intraductal upper outer quadrant mass was ductal carcinoma in situ.



Figure 1: Shows the central darkened area of iatrogenic hematoma within the breast tissue specimen excised using the HUGE technique.

Treatment

Multidisciplinary discussions involving the patient and her family concluded to offer skin-sparing mastectomy and immediate breast reconstruction because she could not access radiotherapy services. She had surgical treatment three weeks after the diagnosis. The histology report of the mastectomy specimen showed florid areas of carcinoma in situ and some areas of invasive disease. Immunohistochemistry stained negatively for oestrogen, progesterone, and human epidermal growth factor Receptor-2 (HER-2) and was reported as a triple-negative molecular subtype. She declined adjuvant combination chemotherapy, and instead opted for herbal supplements of her own volition because of fear of adverse effects, especially fertility issues.

Figure 2: (a) shows the three weeks the postoperative appearance of the scar and reconstructed breast: anterior view (b) posterior view showing the scar of the incision used for latissimus dorsi (LD) rotation



Figure 2: (a)



Figure 2: (a) shows the three weeks the postoperative appearance of the scar and reconstructed breast: anterior view (b) posterior view showing the scar of the incision used for latissimus dorsi (LD) rotation.

Outcome

She developed a cough with radiologic features of pulmonary progression seven months into follow-up and persistent headaches 13 months into follow-up. She died two weeks after the onset of headaches with a clinical but not radiologically confirmed diagnosis of brain metastasis.

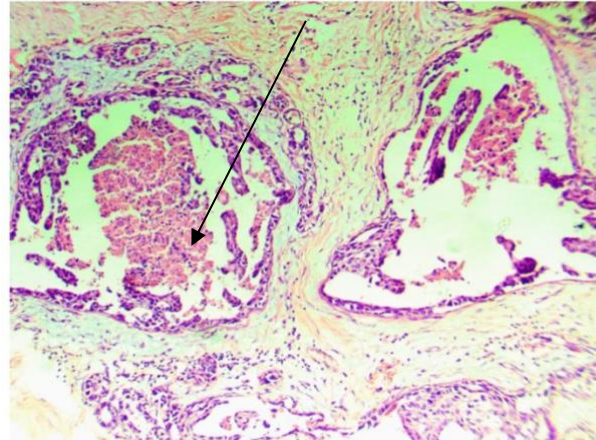


Figure 3: Photomicrograph of post-mastectomy specimen showing mixed *in situ* and the invasive areas. Section shows breast tissue with infiltration by malignant epithelial cells and multiple foci of ductal carcinoma in-situ with central comedo necrosis indicated by an arrow. The cells are round to oval, medium sized, with increased nuclear cytoplasmic ratio, dispersed chromatin pattern, prominent nucleoli and scanty cytoplasm. A few of the tumour cells show dense clumped chromatin pattern, inconspicuous nucleoli and scanty cytoplasm. The stroma is composed of fibrocollagenous tissue with blood vessels. Histologic features are consistent with invasive ductal carcinoma (NST) with Nottingham grade 2.

DISCUSSION

Keeping pace with the standard of care is a perennial challenge in SSA due to the lack of facilities and skills central to best clinical practice. This report presented how we surmounted one of the significant challenges of managing breast cancer in a low-resource center. The report showed how the HUGE technique aided BC diagnosis, providing the possibility of a less mutilating surgical treatment for a young patient.

Reports on nonpalpable breast cancer management are uncommon in developing countries because diagnosing and excising nonpalpable breast cancer often requires expensive technological gadgets and highly coordinated services. In the wire localized biopsy (WLB) technique previously reported by Agodirin *et al* in Nigeria⁸, the procedure involved coordinating the radiographer, the radiologist cum sonologist, and the surgeon. The scheduling of the WLB was tight, requiring immediate operation after the placement of the wire and required shuttling between the theater and the imaging department. There

was more flexibility in the HUGE technique used here and previously reported by Agodirin et al.⁷ HUGE required less complicated coordination but was limited by not confirming the excised lesion with repeat ultrasound scanning before closing the wound. However, the visual location of the hematoma and excision beyond the edges of the iatrogenic hematoma was possible.

Introducing alternative method for excision of nonpalpable lesions in the absence of intraoperative imaging is one of the strengths of the HUGE technique in resource-constrained situations. Nonetheless, where available handheld ultrasound probes might give additional confirmation of the successful excision before closing the wound.

Modified radical mastectomy currently dominates the surgical management of BC in SSA, and it is one of the leading factors linked to treatment delays or refusal. The vicious cycle of the fear of mastectomy, leading to delay and further mastectomy, may be disrupted if more patients are diagnosed with smaller lesions, as was achieved in this report.

The report was the first skin-sparing mastectomy in our center, the first mastectomy with immediate reconstruction in the ten years before, and the current best short-term cosmetic outcome for an unmarried young lady in our center. Our patient did not benefit from breast conservation because of the inability to access radiotherapy and had a short survival because of failure to accept systemic therapy, due to fertility concerns, in the face of an aggressive tumour biology ovum banking is currently the best available method of preserving fertility after chemotherapy; however, this might be unavailable in limited resource centers. Other modalities of limiting the effect of chemotherapy on ovaries include using hormonal agents alone in hormone receptor-positive tumors and cytotoxic medications that are less toxic on the ovaries depending on the tumor biology.

Finally, the report showed the importance of triple assessment. In this patient, completing the triple assessment before excising the benign lesion ensured that the more sinister diagnosis was not missed. The report showed the benefit and relevance of ultrasound in managing breast lesions in a low-resource center.

CONCLUSION

The HUGE technique is a feasible and cheap modification of the HUG technique that can support the management of nonpalpable breast tumors in low-resource centers. This report demonstrates how management of nonpalpable tumors might broaden the surgical options for treating breast cancer in low-resource centers.

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