

Usefulness of Intravenous Digital Subtraction Angiography in Making a Diagnostic Evaluation of the Spread of Non-palpable Breast Cancer

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(Received July 26, 2002)

In a recent case of non-palpable breast cancer we used intravenous digital subtraction angiography to examine the cancerous spread. We describe the usefulness of this technique and report the clinical course of this case. The patient was a 55-year-old female who underwent a mastectomy in 1982 due to cancer in the right breast. Mammography conducted in January 1999 revealed microcalcification in area C of the left breast. According to results obtained from a stereotactic needle biopsy, we made a diagnosis of non-infiltrating ductal carcinoma *in situ*. Although no abnormal findings were observed in palpation and ultrasound examination, intravenous digital subtraction angiography disclosed high-density lesions extending almost entirely over the left breast, especially in area C. A quadrantectomy was selected as the initial surgery. Histologically the lesion was regarded as being papillo-tubular carcinoma accompanied by minimal invasive foci. The surgical margins proved positive and we performed a mastectomy with dissection of axillary nodes. A substantial volume of cancerous remnant was detected in the resected specimen. This study demonstrates that intravenous digital subtraction angiography is an useful technique for examination of the spread of non-palpable breast cancer.

Introduction

We conducted intravenous digital subtraction angiography (IV-DSA) in 500 cases of breast cancer and report the usefulness of this technique as a prognostic indicator^{1)~3)} and in making a diagnostic evaluation of the spread of cancer, including intraductal non-infiltrating cancerous lesions⁴⁾⁵⁾. In a recent case of non-palpable breast

cancer we used IV-DSA to examine the spread of cancer. We report on the clinical course of this case with reference to the literature.

Case Report

Patient: The patient was a 55-year-old female. A routine mammography showed concentric fine calcification localized in the upper outer quadrant of the left breast (Fig. 1). She underwent a mas-

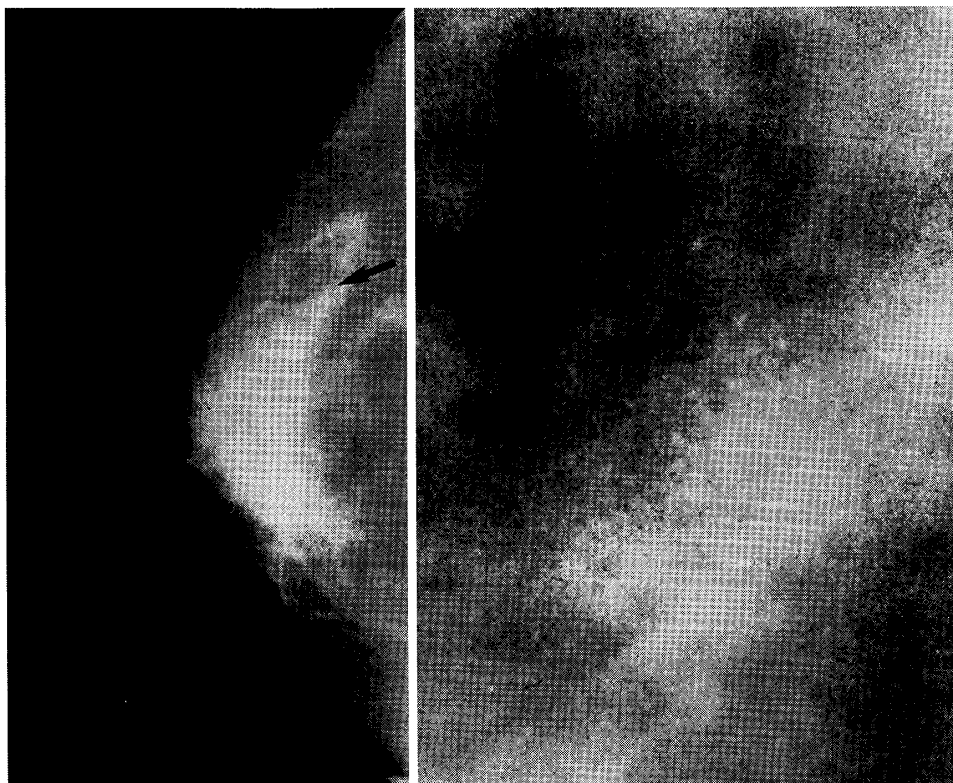


Fig. 1 Concentric fine calcification (arrow) localized in the upper outer quadrant of the left breast was recognized (left). High magnification of the calcification (right).

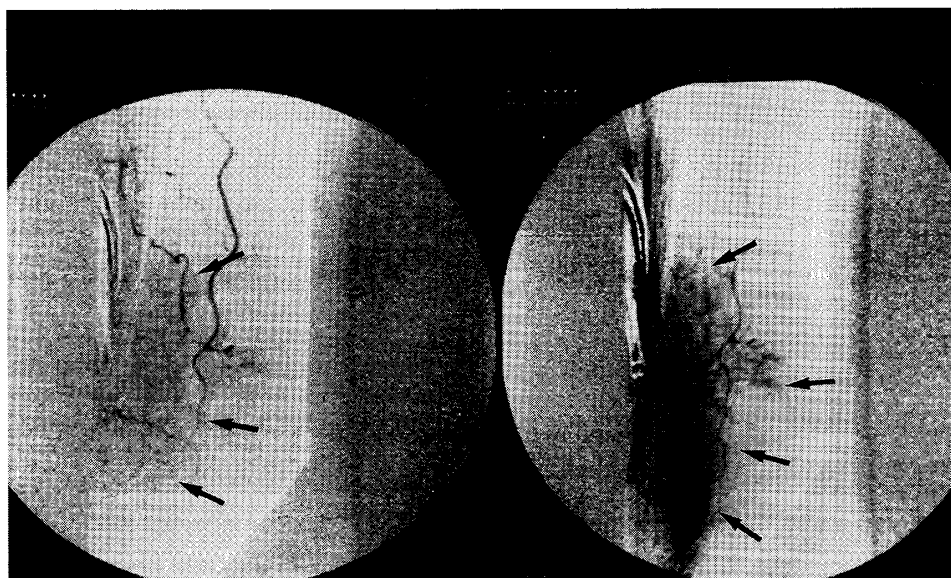


Fig. 2 The film on the left is the arterial phase 10 seconds after the injection of contrast medium, while the film on the right is the capillary phase showing the high-density areas throughout the breast. Arrow heads indicate the tumor staining.

tectomy twelve years ago due to breast cancer in the right breast. At that time, the resected lesion

was classified pathologically as papillo-tubular carcinoma, t1 n0, ly0, v0, stage I. There were no

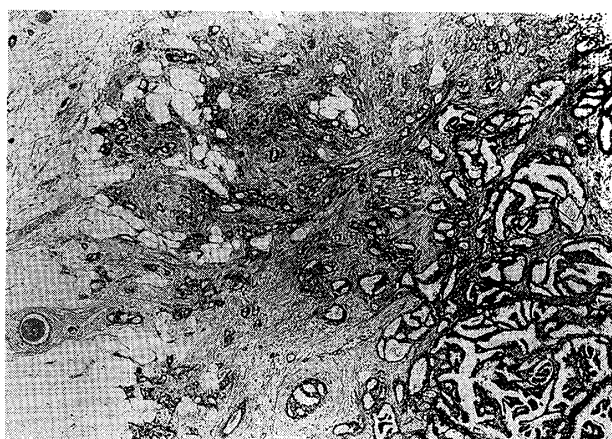


Fig. 3 Papillary proliferation of intraductal components and scattered minimal invasive foci was observed.

signs of relapse. No definite masses or superficial lymph nodes were palpated in the left breast. Echograms showed no abnormalities.

A stereotactic needle biopsy was conducted to examine the fine calcification formed in the left breast. According to these results, a diagnosis of non-infiltrating ductal carcinoma *in situ* (DCIS) was made. IV-DNA was conducted for further evaluation.

IV-DNA: The Shimadzu Digital Subtraction Angiography System DAR1200 was used to examine the lesion. The size of the matrix was 512×512 pixels. Prior to initiation of IV-DNA, a 16G elastic catheter needle was inserted into the left cubital vein to inject the double layer solution containing iopamidol (40 ml) and physiological saline (40 ml) at the rate of 15 ml/sec¹⁾. IV-DNA revealed high-density areas throughout the breast and the patient was diagnosed with extensive DCIS requiring therapeutic intervention by mastectomy (Fig. 2).

Surgery and pathology: Based on IV-DNA findings a mastectomy was recommended as the most appropriate treatment, however, the patient refused this treatment. We then performed a quadrantectomy after obtaining written informed consent. Pathological examination of the

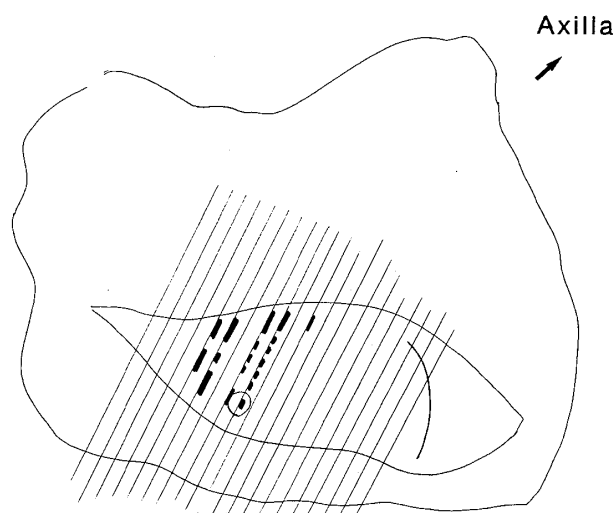


Fig. 4 This is the pathological map of a cancer nest of the additionally resected breast. The curvilinear line indicates the scar of the previous surgery. A small circle indicates the nipple. The thick straight line marks the cancerous lesion. Many lesions of intraductal cancer remained in the additionally resected breast.

resected specimen revealed widely spread intraductal components of non-comedo type and a diagnosis of invasive ductal carcinoma (papillotubular adenocarcinoma) with scattered minimal invasive foci was made (Fig 3). The stumps proved positive in all directions. These findings indicated the need for additional resection and total mastectomy with axillary lymph node dissection was performed. Remnants of intraductal components in the mastectomy specimen were extensive (Fig. 4) and no lymph node metastasis was recognized.

Discussion

For breast conservation to be appropriate in the treatment of breast cancer, specimens collected from stumps should be negative for cancer. For this reason an accurate preoperative evaluation of the progress of the cancer is important. Mammography and echography have traditionally been used for imaging examination, however the usefulness of CT⁶⁾, MRI^{7)~8)}.

We have conducted IV-DNA in preoperative imaging examinations in approximately 500 cases

of breast cancer since 1986 and report the usefulness of this technique in making a diagnostic evaluation of the spread of cancer, including intraductal non-infiltrating cancerous lesions^{1)~5)}. IV-DNA is similar to MRI and CT in that it uses contrast medium to visualize tumor vascularization. Advantages of IV-DNA over MRI and CT include: simple insertion of elastase and ease of manipulation; short examination periods of approximately 10 minutes; less invasive examination with no induction of severe complications; higher delineation rates (including 95% for all types of breast cancer and 90% for DCIS); and use of digital signals for the quantification of delineated sites. Disadvantages of IV-DNA are that delineation of lesions can only be made from one direction and there may be difficulty in visualizing and accurately reading images of lesions three-dimensionally due to artifacts caused by body movement.

In the present case, IV-DNA successfully delineated the spread of non-palpable breast cancer that could not be visualized by mammography and echography. False positives are a possibility with IV-DNA because benign epithelial growth of duct papillomatosis in addition to DCIS are delineated as high-density tumorous lesions (unpublished data). As differentiation of cancer from benign epithelial growth lesion is important caution should be exercised in cases in which cancer is accompanied by remarkable epithelial growth. The fact that the spread of non-palpable breast cancer lesion can be accurately reflected by IV-DNA suggests that it is feasible to apply IV-DNA to the diagnostic evaluation of cancerous spread before the introduction of breast conservation

therapy. In conclusion, IV-DNA can serve as a useful imaging examination tool, and can provide reliable information necessary for evaluating the spread of non-palpable breast cancer lesions. The application of IV-DNA to breast conservation therapy is anticipated.

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IV-DISA が癌の広がり診断に有用であった非触知乳癌の 1 例

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清水	忠夫・渡辺	修・平野	明・今村	洋・木下	淳・歌田	貴仁					
オカベ	トシヒロ	キムラ	キヨミ	ハガ	シュンスケ	アイバ	モトヒコ	オガワ	ケンジ		
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我々は過去 500 例以上の乳癌に術前 intravenous digital subtraction angiography (IV-DISA) を施行し、乳管内非浸潤癌巣 (intraductal cancer spread) をふくめた癌の広がり診断に有用であることを報告してきた。今回 IV-DISA により癌巣の広がりを描出できた非触知乳癌を経験したので報告する。症例は 55 歳女性で、1982 年右乳癌で乳房切除術を施行し、1999 年 1 月マンモグラフィーで左乳房 C 領域に局限した微小石灰化を認めステレオ下生検 (stereotactic needle biopsy) を施行し、非浸潤性乳管癌 (ductal carcinoma in situ, DCIS) の診断を得た。触診、超音波検査では異常はなかったが IV-DISA で C 領域を中心として乳房ほぼ全域に広がる濃染像を認めた。乳房切除術の適応となる広範囲の DCIS と診断したが、患者とも相談の上、quadrantectomy を施行した。組織学的には小浸潤巣 (minimal invasive foci) を伴う papillo-tubular carcinoma で、surgical margin が広範囲にわたって陽性であり、後日腋窩郭清を伴う乳房切除術を追加施行した。なお切除標本には癌遺残が著明であった。非触知乳癌における癌の広がり診断には従来の画像検査に加えて MRI, CT などが行われるが IV-DISA も重要な検査手段になり得ると考えられた。