Alopecia Neoplastica due to Breast Cancer

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We report a case of alopecia neoplastica—a rare form of cutaneous metastasis—in a 43-year-old Korean woman, who presented with multiple red, bald patches of 1 month’s duration on her scalp.

About 2 years previously, she received a modified left radical mastectomy and adjuvant chemotherapy for breast cancer.

Histopathological findings of the bald lesions revealed diffuse infiltration of hyperchromatic tumor cells arranged singly and in strands and cords in the upper and lower dermis.

We started chemotherapy with Adriamycin, but she died 13 months later.

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Key Words: Alopecia neoplastica, Breast cancer, Cutaneous metastasis.

Carcinoma of the breast was reported to be the commonest source of metastases to the skin in women by Brownstein and Helwig.1 In the two studies by Korean investigators,2,3 the breast was also the most important origin of cutaneous metastasis in women, but the cases of metastases to the scalp were rarely recorded. We could not find any reports of alopecia neoplastica in the Korean literature.

In fact the scalp is not an uncommon site of cutaneous metastasis as reported in most medical literature. In the scalp, the lesions, which are presumably due to hematogenous spread, usually take the form of nodules,4 but the occurrence of alopecia without nodules appears to be rare.5,10

Although breast carcinoma ranks third in frequency after cervical and stomach carcinoma, recently its incidence is on the increase. In Korean women, breast carcinoma is reported to metastasize to the skin more frequently than does cervical and stomach carcinomas.2,3,11,12 Therefore, a biopsy of alopecia-like lesion in women in the cancer-prone age group might be warranted as mentioned by some foreign investigators.8

REPORT OF A CASE

The patient, a 43-year-old Korean woman, noted a small nodule in her left breast, of 4 months’ duration. On April 25, 1986, a modified left radical mastectomy was performed. Microscopic examination revealed an infiltrating ductal adenocarcinoma. No metastasis to other sites could be found by physical examination and radioisotope studies. The patient received adjuvant chemotherapy with cyclophosphamide, methotrexate, and 5-fluorouracil followed by administration of tamoxifen, an antiestroergen.

Twenty-five months later, she was referred to our clinic because of multiple red, bald patches on her scalp which had first been noted 1 month before and gradually enlarged. They were regarded as nonspecific by her first physician.

On inspection, the skin lesions were red in color and the number of hair follicles was reduced (Fig. 1). Upon palpation, they were hard.

Physical examination revealed no positive find-
ings other than the bald lesions of her scalp and the post-operative scars of her chest.

Laboratory examinations including complete blood cell count, ESR, urinalysis, liver function test, renal function test, electrolytes, and electrocardiogram were within normal limits or negative. Findings from the chest roentgenogram, bone scan, liver scan, and gallium scan were normal.

Histopathological examination of the bald lesions revealed diffuse infiltration of hyperchromatic tumor cells throughout the dermis; however, the uppermost dermis was spared (Fig. 2). The infiltrating cells were arranged singly and in small groups or in single-row lines between thickened collagen bundles (Fig. 3). The hair follicles were atrophic and there was marked surrounding fibrosis (Fig. 4). Some of these tumor cells were positive by periodic acid-Schiff stain (Fig. 5). The diagnosis of
alopecia neoplastica could be made by the clinical and histopathologic findings.

Although we started chemotherapy with adriamycin, the number of alopecic patches increased without any notable regression. The patient died 13 months later.

**DISCUSSION**

Alopecia neoplastica is a rare form of cutaneous metastasis. It has been known that alopecia neoplastica arises almost exclusively from cancer of the breast. However, a case of alopecia neoplastica from the stomach has been reported.\(^{13}\)

Breast carcinoma is one of the commonest cancers in women and spread of the tumor occurs through lymphohematogenous routes. Favorable sites for dissemination are the lymph nodes, lungs and liver; spread to the skin is relatively rare.\(^{14}\) But in view of the occurrence of cutaneous metastases in women, they most frequently arise from cancer of the breast and occur mostly on the anterior chest wall.\(^{1}\) More distant metastases are sometimes found on the scalp and the lesions usually show nodular carcinoma.\(^{4}\) However, the form of flat alopecia, alopecia neoplastica, rarely occurs.\(^{5-10}\)

Park et al.\(^{2}\) and Kim et al.\(^{3}\) have reported that the breast was the most important origin of the cutaneous metastases in Korean women and the lung and stomach were the commonest source in men. Metastases to the scalp were present in 31 out of 186 cases of those studies, mostly from lung, liver and kidney. Metastases to the scalp from breast, however, occurred in only 2 of these cases and no alopecia neoplastica secondary to breast carcinoma has been reported.

The modes of spread to the skin of an internal tumor includes direct invasion of the skin from an underlying growth, extension of tumor cells through lymphatics, lymphatic emboli, hematogenous emboli and accidental implantation of tumor cells via surgeon’s gloves or instruments. The mechanism by which metastasis occurs from breast to the scalp may be either lymphatic spread or via hematogenous dissemination.\(^{15,16}\)

There are many theories as to why the scalp is a frequent site of cutaneous metastasis. The most acceptable one is that scalp has a high degree of vascularity, immobility and warmth which enhances the proclivity for metastasis to this region.\(^{16,17}\) It seems that the histologic type of carcinoma is of only slight importance in affecting the rate of metastasis to the skin.\(^{16}\) Generally, there is a close relation between the histologic findings of the primary tumor and those of the metastatic lesion and breast cancer best demonstrates this. Thus, the histologic features of the metastatic lesion is of some value in determining the site of origin.\(^{15}\)

Histologically, the bald lesions in our patient showed a diffuse infiltration of tumor cells throughout the dermis. The infiltrating cells were arranged singly and in single files. There were atrophic hair follicles with fibrosis, as described by Cohen et al.\(^{6}\) These findings were not different from those in typical alopecia neoplastica. But a case with morphea-like alopecia of the scalp, which showed, histologically, epidermotropic features of metastatic breast cancer has been reported.\(^{10}\)

The time relationship between the primary cancer and cutaneous metastases can be quite variable. Skin involvement may closely follow the discovery of an internal malignancy, may occur relatively late in the course of the disease process, or may be the initial sign of the malignancy.\(^{1,4,8}\) In
our patient, cutaneous metastases were discovered in the scalp 2 years following mastectomy for her primary breast cancer. Because the bald lesions were the only metastatic lesions and there was no metastasis to other sites including lymph nodes, our differential diagnosis included morphea, discoid lupus erythematosus, pseudopelade, alopecia areata and morphea-like basal cell epithelioma in addition to cutaneous metastases.

Metastasis from a carcinoma is generally held to be an ominous sign but metastasis to the skin does not always herald impending death.\textsuperscript{9,16} Nelson,\textsuperscript{7} for example, described a case of alopecia neoplastica positively of 28 years' duration. In our case, the patient survived for about 14 months after cutaneous spread, although she was placed on adriamycin therapy immediately after the diagnosis.

The scalp is not an uncommon site of cutaneous metastasis and, in women, the breast is the most frequent primary site. Since a metastatic lesion of the scalp may be the initial sign of an internal malignancy and may be the first appearing metastatic lesion, as in our case, a biopsy of an area of alopecia in women in the cancer-prone age group may be necessary to rule out this possibility.

REFERENCES