

**Breast imaging and histopathologic
correlation of breast lesions in patients
with transplanted kidney**
- different features from usual fibroadenoma -

Thesis By

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**Breast imaging and histopathologic
correlation of breast lesions in patients with
transplanted kidney**

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Abstract

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Immunosuppression may predispose to infection and malignancy as seen in organ transplant patients. Especially, cyclosporin A affects to transplant patients led to changing pattern of post-transplantation malignancy. Under immunotherapy status in renal transplanted patients, the characters of breast lesion are rarely reported by surgern. Hence, the purpose of this study is to assess the breast lesions involving patients with transplanted kidney and to analyze the imaging characters and histopathologic features of breast lesions in transplanted patients who had long term cyclosporin A and steroid therapy, and to analyze the different imagings and histologic features between the fibroadenomas in kidney transplanted patients and those in control group.

From 1990 to 1999, one thousand four hundred and thirty eight patients were underwent renal transplantation in our institute. Among them, 486 patients were female. All patients have routinely received long duration immunosuppressive therapy with cyclosporin A, sterotid after renal allograft. And according to the symptom of the patients, 5 patients of them have taken azathioprine therapy. We analyzed twelve female patients who had complaints of palpable breast mass during chemotherapy. The breast lesions were evaluated with mammography and breast

sonography. They underwent operation due to breast lesions. Each radiologic and histologic datas were compared to fibroadenomas developed in control group without cyclosporin A treatment, underlying disease or any other medication.

The pathologic findings of 12 patients were as follows : seventeen fibroadenomas(n=9), two DCIS(n=2), one invasive ductal carcinoma(n=1), and bilateral papilloma and papillomatosis(n=1). Six of 12 patients had multiple fibroadenomas and among them 5 patients had bilateral fibroadenomas. Mean diameter of fibroadenomas was 4.17 ± 2.5 cm. Mean duration from renal transplantation to histologic confirmation of breast lesions was 4.6yrs(1.7- 8.8yrs).

Mammography of the lesions showed spherical shape and well circumscribed margin with unusually high density mass. None of the lesions showed calcification or spiculation. Sonographic findings of the masses showed relatively high echogenicity with higher L/T(longitudinal diameter/transverse diameter) ratios than usual benign masses, even though, homogeneous internal echo and well circumscribed margin consistent with benign. Most of them had been growing rapidly.

In conclusion, fibroadenomas developed in the patients with renal transplantation showed a tendency to be multiple, bilateral and larger in size. They showed rapid growth and spherical shape and unusually higher internal echo and higher L/T ratio than usual fibroadenoma.

Key Words : kidney transplantation, cyclosporin A therapy, breast mass, fibroadenoma

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I. Introduction

The long term safety of cyclosporin A therapy remains equivocal in terms of metabolic or immunosuppressive side effects. A decrease in renal function and an elevation of blood pressure are the principal cyclosporin A related metabolic consequences. Immunosuppression may predispose to infections and malignancies as seen in organ transplant patients.¹

Cyclosporin A influences humoral and cellular immunity with its major effects in the early phase of helper T-cell activation.² The consequences of cyclosporin A-driven immunodepression are best known in transplanted patients. The combination of several immunosuppressive drugs increases the risk of malignancy because of their capacity to permanently inhibit the T-lymphocyte clones that recognize oncogenic virus.³ It was believed that the introduction of cyclosporin A into the

immunosuppressive regimen given to transplanted patients led to a changing pattern of post-transplantation malignancies in comparison with conventional azathioprine-prednisone therapy.⁴ An increased incidence of non-Hodgkin lymphoma,⁵ Kaposi's sarcoma^{4,6} and renal, endocrine and cutaneous malignancies was reported.⁷ In addition, lymphomas and skin tumors occurred earlier.⁸ Rare cases of cutaneous melanoma developing during cyclosporin A therapy in patients treated for renal transplantation and systemic diseases were also reported.^{9,10}

Breast tumors have rarely been reported in cyclosporin A-treated transplanted patients.^{11,12} The incidence of de novo breast cancers in women chronically immunosuppressed after organ transplantation appears even lower than in the general population, supporting the notion that some women develop breast cancer following immune promotion of oncogenesis.¹³ Other benign lesion such as fibroadenoma of the breast in transplanted patients are also rarely reported.¹⁴ There was a positive association between the use of cyclosporin A for immunosuppression after renal transplantation and the prevalence of multiple fibroadenomas of the breast.

We are going to analyze imaging findings and histopathologic features of breast lesions in kidney transplanted patients who had long term cyclosporin A and steroid therapy and compare the imaging and histopathologic findings of fibroadenomas in kidney transplanted patients with fibroadenomas in the patients without cyclosporin A treatment and evaluate the effects of cyclosporin A and steroid to the breast tissue.

II. Materials and Methods

From 1990 to 1999, one thousand four hundred and thirty eight patients underwent renal transplantation in our institute. The mean age of the kidney transplanted patients was 41.7 ± 12.4 years (range 5-72). Among them, 486 patients were female and 952 male. The mean follow-up time was 68.7 ± 48.9 months with a maximum of 116.8 months.

All patients have received routinely long duration immunosuppressive therapy with cyclosporin A, and steroid(prednisolone) after renal allograft. And according to the symptoms of the patients, five patients of them have taken azathioprine therapy. Cyclosporin A was administered orally with a starting dose of 10 mg/ kg body weight to reach a blood concentration of 180-250 ng/ml proved by monoclonal assay. Prednisolone was reduced from 250 mg intraoperatively and on the first postoperative day, to 0.1 mg/kg body weight up to the 40th day postoperative day. Azathioprine was given at 2 mg/kg body weight based on consideration of the leukocyte and lymphocyte count.

Among them, we analyzed twelve female patients who had breast complaints of developed palpable breast mass during chemotherapy. The mean age of the patients with breast lesions was 38.9 ± 10.2 years (range 18-55). The mean follow-up time was 80.7 ± 28.5 months with a maximum of 104.7 months. All of them received immunosuppressive therapy with cyclosporin A, and steroid(prednisolone) with same dosage with above. And among them five patients have taken azathioprine

therapy. All of 12 patients underwent breast surgery due to palpable breast mass during chemotherapy. Nine patients underwent breast excision and each of other 3 patients underwent partial mastectomy, simple mastectomy with axillary lymphnode dissection and modified radical mastectomy.

The donor type of each patient were: living related donor(n=3), living unrelated donor(n=8) and cadaver donor(n=1). Duration of dialysis before transplantation was 42.5 ± 37.9 months(range2-108). None of them had the rejection episode.

All patients with breast lesions examined with mammography and breast sonography. For the mammographic exam, we used Senographe 500 T(CGR, France) or Senographe DMR(GE, Milwaukee, Wisconsin, USA). They have taken mediolateral oblique and craniocaudal view, routinely and if needed, magnification or spot compression view were added. In breast sonography, we used ATL HDI 3000(Advanced Technology Laboratories, Bothell, Washington, USA) and scanned whole area of breast with 10 MHz transducer.

Two radiologists analyze independently the number and size of the masses, the density of the masses in mammography, the margin of the masses and the change of underlying breast parenchyma. In breast sonography, the author analyze the echogenicity and internal echo of the masses, the presence of septum and posterior shadowing or enhancement, and to evaluate the longitudinal / transverse diameter ratio(L/T ratio).

In histopathologic analysis, with H-E stain(Hematoxylin-Eosin stain) and light microscope, x40, x100, x400 magnification was used. We evaluate the amount of

cellularity, mitotic activity and differentiation, and composition of stroma, ductal hyperplasia or dilatation, and amount of angiogenesis of blood vessels.

Each data was compared to fibroadenomas in normal population without underlying any diseases or without administration of any medication. The normal population group was 20 patients. The mean age of them was 31 years(range 16 – 47). They all underwent breast excision due to fibroadenoma.

We evaluate the difference of mass size and L/T ratio of fibroadenomas in two groups using student T-test in statistically.

III. Result

From 1990 to 1999, one thousand four hundred and thirty eight patients underwent renal transplantation in our institute. Among them, twelve female patients had complaints of palpable breast masses in the follow-up period. Mean age of the patients with breast lesions was 38.9 ± 10.2 years (range 18-55). The mean follow-up time was 80.7 ± 28.5 months with a maximum of 104.7 months. All 12 patients underwent breast surgery.

The pathologic findings of 12 patients were as follows : seventeen fibroadenomas(n=9), two DCIS(n=2), one invasive ductal carcinoma(n=1), and bilateral papilloma and papillomatosis(n=1). Six of 12 patients had multiple fibroadenomas, and among them, 5 patients had bilateral fibroadenomas. The mean diameter of fibroadenomas is 4.17 ± 2.5 cm. The mean duration from renal transplantation to histologic confirmation of breast lesions is 4.6 years(1.7 - 8.8 years)(Table 1).

Mammographic features of fibroadenomas showed spherical shape and well circumscribed margin with unusually high density masses. None of the lesions showed calcification or spiculation(Figure 1).

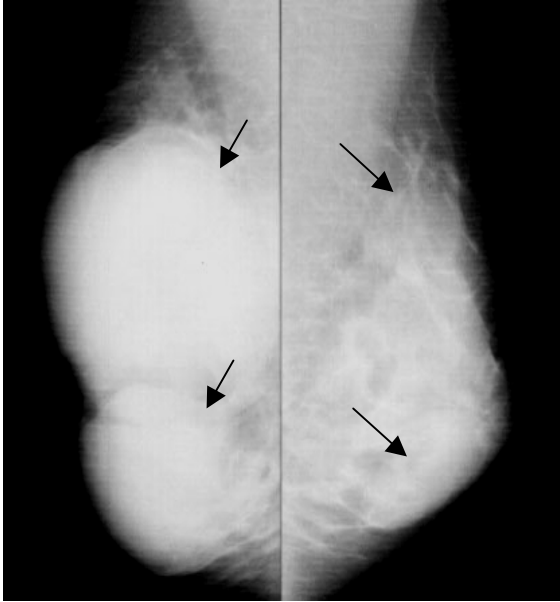


Fig. 1A

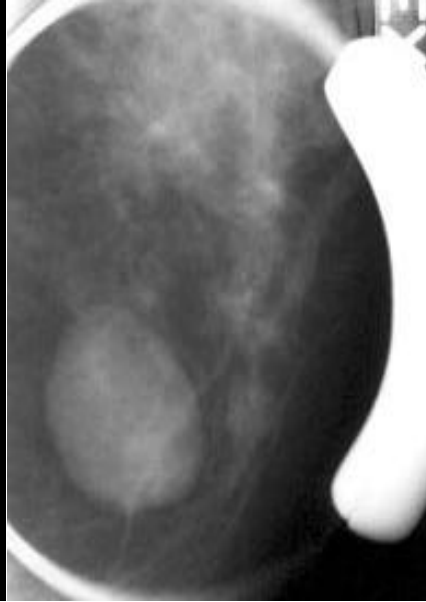


Fig. 1B

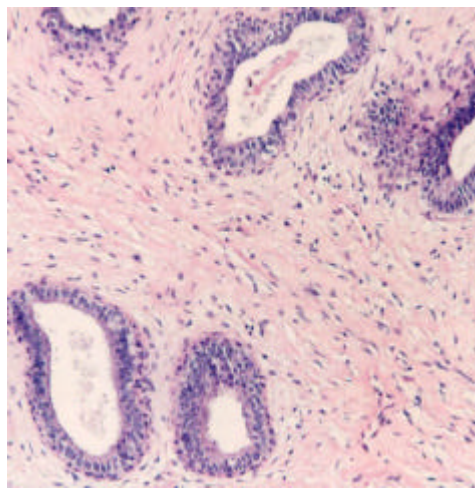


Fig. 1C

Fig. 1. A 21 year old patient who had kidney transplantation who had taken cyclosporin A therapy during 28 months.

- A. Mammography(MLO view) : There are multiple and bilateral, well circumscribed masses(arrows) in both breasts. The masses show relatively high density without calcification or spiculation.
- B. Cone compression view of one of the masses in the left breast.
- C. Histology of the mass, fibroadenoma, intracanalicular pattern. There shows epithelial hyperplasia in the ducts and higher fibroblastic cellularity of stroma (H-E stain, x100).

Sonographic findings of the fibroadenomas showed relatively high echogenicity with higher L/T ratios than usual benign masses. The mean L/T ratio was 0.94 ± 0.61 . Even though, homogeneous internal echo and well circumscribed margin consistent with benign(Figure 2).



Fig. 2A

Fig. 2B

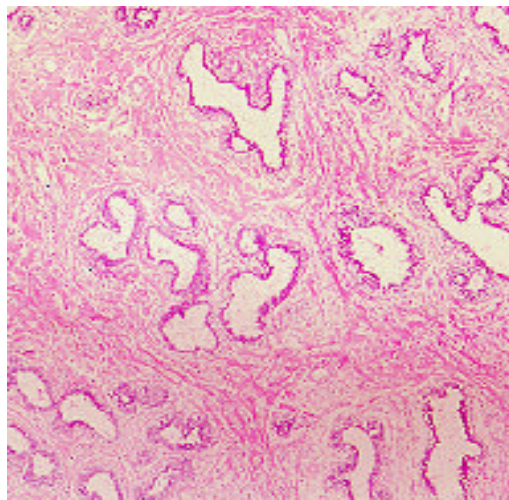


Fig. 2C

Fig. 2. A 18 year old patient who had kidney transplantation and had taken long duration of cyclosporin A therapy during 57 months. She had multiple and bilateral masses.

A. The mass was too large to contain within the scan area. The mass showed well-circumscribed margin and high and heterogeneous echogenicity.

B. Another mass in left breast showed well-circumscribed margin and posterior enhancement. The L/T ratio of the mass was 1.1(arrows).

(L/T ratio: longitudinal diameter / transverse diameter ratio)

C. Histology of the mass, fibroadenoma, the stroma composed of fibroblasts is more cellular than that of a classic fibroadenoma. There are compressed and elongated epithelial component. The growth pattern is pericanalicular.(H-E stain, x40).

Mammographic and sonographic findings of each lesion were listed(Table 1).

Table 1. Radiologic and pathologic features of breast lesions in patients with transplanted kidney

Case No	1	2	3	4	5	6
Age(yrs)	21	22	43	46	18	43
Duration(yrs)	2	3	3	3	4.9	6
Mammography	Sharply marginated, huge, bilateral multiple masses	Well defined, huge, multiple masses, Rt	DY breast, well defined mass, Rt	DY breast, well defined mass, Lt	Not done	Well marginated, multiple masses, Lt
Ultrasonography	Well defined, round, multiple masses	Well defined, round, multiple masses, Rt ¹⁾ Well defined mass, Lt ²⁾	Oval shaped mass, Rt	Oval shaped mass, Lt	Sharply marginated, round, multiple masses	Well marginated, bilateral, multiple masses
Pathology	Bilateral fibroadenomas with florid epithelial hyperplasia	Multiple fibroadenomas	Fibroadenoma	Fibroadenoma	Fibroadenoma	Fibroadenoma

7	8	9	10	11	12
48	41	47	44	55	41
6.3	7	6.7	3	2	8.8
DY breast	Well defined, bilateral, multiple masses	Clustered microcalcification, asymmetric density, LUC ³⁾ Well defined, high density mass, LMC ⁴⁾	Asymmetric density within DY breast, LUO ⁵⁾	Spiculated mass, RUO ⁶⁾	Well circumscribed, bilateral, multiple masses
Well marginated, oval shaped mass	Well defined, bilateral, multiple masses	Ill defined mass with microcalcifications Echogenic mass with posterior enhancement	Ill defined, low echoic lesion	Ill defined, low echoic mass	Multiple masses within dilated duct Ill defined, multiple, lobulating, low echoic masses
Fibroadenoma	Fibroadenoma	DCIS ⁷⁾ , comedo type. FCD ⁸⁾ with ADH ⁹⁾ Fibroadenoma	DCIS, non comedo type, rich mucin, focal calcification	Invasive ductal carcinoma with pseudosarcomatous metaplasia	Intraductal papilloma with florid epithelial hyperplasia Papillomatosis (multiple peripheral papillomas)

1) Rt : right, 2) Lt: left, 3)LUC : left upper central, 4) LMC: left medio-central, 5) LUO: left upper outer, 6) RUO: right upper outer , 7) DCIS: ductal carcinoma in situ, 8) FCD: fibrocystic disease, 9) ADH: atypical ductal hyperplasia

Histopathologic findings of fibroadenomas showed a proliferation mainly fibrous stroma and glandular elements, features that are diagnostic for fibroadenomas (Figure 1,2). As comparing with usual fibroadenomas, six of the cases showed more cellular stroma and two cases showed mitotic activity. One case showed epithelial hyperplasia and the other case showed ductal hyperplasia. None of them showed ductal dilatation or angiogenesis.

We compared the data for fibroadenomas in the control group. There were twenty-six fibroadenomas in the twenty patients, among them, four patients had multiple fibroadenomas and two had bilateral fibroadenomas. The mean diameter of fibroadenomas was 1.9 ± 1.5 cm and mean L/T ratio was 0.58 ± 0.23 . Statistically, the size of the fibroadenomas in the transplanted patients was larger than that of the control group ($p < 0.01$). The L/T ratio was also significantly larger than the control group ($p < 0.05$). In mammography and ultrasonography, almost all the masses showed typical findings of fibroadenomas. Histologically, none of the fibroadenomas showed mitotic feature, angiogenesis, ductal hyperplasia or hypercellularity.

Several different features of the fibroadenomas in the transplanted patients with long term cyclosporin therapy from fibroadenomas in non-transplanted patients (Table 2).

Table 2. Different Features of Fibroadenomas in Transplanted Patients vs Non-transplanted Patients

	Transplanted Patients (n=12)	Non-transplanted Patients (n=20)
Mammography	Higher density(n=7)	High density(n=14)
Ultrasonography	Round to oval shape(n=12)	Oval shape(n=15)
	High L/T ratio (0.94 ±0.61)	Low L/T ratio (0.58± 0.23)
Doppler	Penetrating vessels (n=2)	Marginal vessels(n=17)
Histology	Higher cellularity (n=6)	Normal cellularity (n=18)
	Mitotic feature (n=2)	Mitotic feature (n=0)

First of all, the fibroadenomas in transplanted patients show larger size than usual fibroadenomas, and had tendency to multiple and bilateral manifestation. Mammographically, the fibroadenomas in our patients show higher density than usual fibroadenomas, but well-circumscribed margin, round to oval shape and absence of spiculation or calcification were compatible with benign masses. In ultrasonography, the fibroadenomas in transplanted patients show relatively high internal echo and homogeneous echogenicity and high longitudinal/transverse(L/T) ratio. In Doppler study, some masses of them show relatively plenty of blood vessels and sometimes penetrating vessels.

Histologically, the all fibroadenoma specimens showed abundant proliferation of stroma and glandular tissue which were diagnostic features of typical fibroadenoma.

Six specimens showed higher cellularity than usual fibroadenoma and two of them showed mitotic features.

In patients with ductal carcinoma in situ(DCIS) or invasive carcinoma, they showed relatively typical radiologic findings, but ultrasonography of one of the patients showed strong posterior shadowing and parenchymal retraction, suggestive of prominent fibrous component(Figure 3)

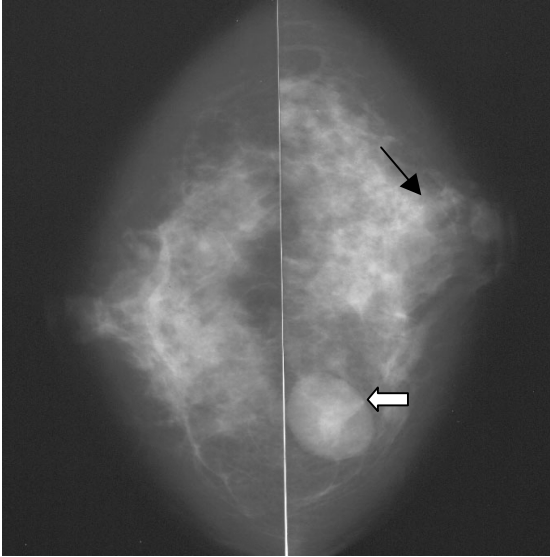


Fig. 3A

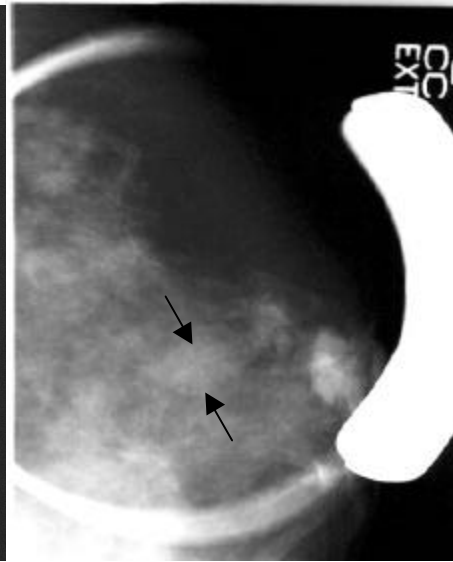


Fig. 3B

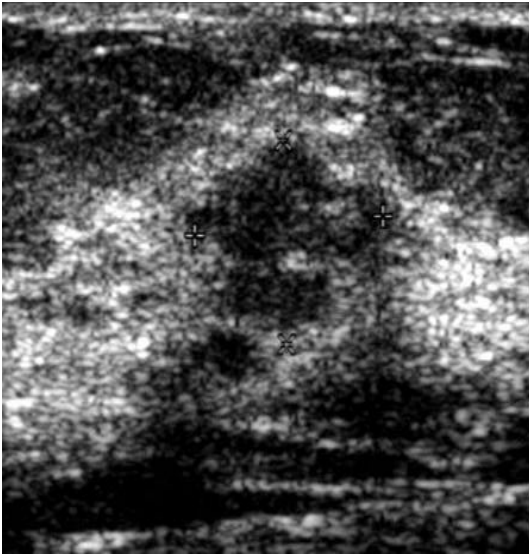


Fig. 3C

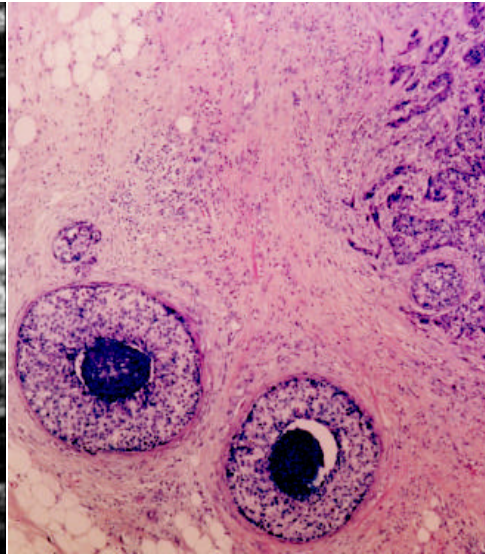


Fig. 3D

Fig. 3. A 47 year old patient who had kidney transplantation and undergone cyclosporin A therapy during 49 months.

A. Mammography(craniocaudal view) showed asymmetric density with clustered microcalcifications at LUC portion(arrow). Another lesion in left medial portion of the breast showed well-circumscribed margin and high density, suggestive of fibroadenoma(open arrow).

B. Cone compression view of LUC portion showed spiculated ill-defined density with clustered microcalcifications, suggestive of malignancy(category 4,5).

C. Breast ultrasonography of LUC lesion showed ill-defined, low-echoic mass with spiculation. Posterior shadowing and parenchymal retraction probably from prominent fibrous component.

D. Ductal carcinoma in situ with necrosis, comedo carcinoma. Two ducts show a atypical malignant cellular proliferation with comedo calcifications. Another site shows microinvasive carcinoma. The stroma appears high fibroblastic cellularity and prominent desmoplasia.(H-E stain, x100)

IV. Discussion

Immunosuppressive agents are essential for the prevention and treatment of rejection after organ transplantation. Cyclosporin A, steroid, and azathioprine are the basic regimens in renal transplant recipients and sometimes monoclonal and polyclonal antilymphocyte antibodies are used. Cyclosporin A has well recognized side-effects, but the causative mechanisms of which are poorly understood. For example, gingival hypertrophy is widely encountered and patients frequently require oral surgery for its correction. In this situation cyclosporin is thought to act by a direct effect on gingival fibroblasts, promoting both proliferation and collagen production.¹⁵ There was a positive relation between the use of cyclosporin A for immunosuppression after renal transplantation and the prevalence of multiple, giant fibroadenomas of the breast. But there was no association between the presence of gingival hypertrophy and the presence of fibroadenomas. This might imply that the mode of action of cyclosporin A in the promotion of breast fibroadenoma is different from its action on the gingiva. Its biological activity has been described.^{16,17}

A few reports described that some populations of lymphocytes and fibroblasts exhibit cyclosporin receptors.¹⁸ Cyclosporin A could potentially promote evolution of fibroadenomas, by a direct action on fibroblasts. Cyclosporin A has also been found to block prolactin receptors in T lymphocytes.¹⁹

Another reports said that those with fibroadenomas had higher serum estradiol concentrations, with lowering of FSH. Cyclosporin A has an effect on the hypothalamopituitary axis in rats: serum luteinizing hormone secretion is inhibited and testicular testosterone biosynthesis is decreased, and this feature is dose-dependent.²⁰ Endocrine mechanisms may have a role in this clinical situation. Unfortunately, our patients had not been checked for serum estradiol, or FSH or LH levels. Perturbation of endocrine function may be as much due to relief of uremia after transplantation as to cyclosporin A.²¹

As previously mentioned, various mechanisms for the association of cyclosporin A with multiple fibroadenomas have been suggested, including effect on fibroblasts (some fibroblasts have cyclosporin receptors), effect on hypothalamic-pituitary axis (demonstrated in rats), and, less likely, resolution of uremia.¹⁴

Fibroadenoma is a benign tumor that arises from the epithelium and stroma of the terminal duct lobular unit and is the most common breast tumor in adolescent girls and young women. In most cases, the fibroadenoma is solitary and is palpated by the patient. Multiple fibroadenomas occur in about 15% of affected patients.²² The majority of fibroadenomas are less than 3cm in diameter ; only about 10% of fibroadenomas are greater than 4 cm .²³ Fibroadenomas more than 5 cm in diameter or weighting more than 500 grams are known as giant fibroadenomas.²⁴ In addition, multiple giant fibroadenomas are rare; to our knowledge, only 22 cases have been reported.²⁵ In our cases, 6 patients had multiple and giant fibroadenomas. These

lesions commonly recur after excision or are replaced by newly arising lesions and may result in massive breast enlargement and deformity bilaterally, sometimes requiring mastectomy.²⁶

A total of 12 cases of multiple fibroadenomas in association with cyclosporin A therapy were described by Baildam et al and Rolles and Calne.^{14, 29} The size of the fibroadenomas was not specified, but most of the lesions were palpable. Unlike the present case, none of these 12 cases involved giant fibroadenomas. In the study by Baildam et al, fibroadenomas were seen in 13 of 29 women with renal transplants who had undergone cyclosporin A therapy. Ten cases involved multiple lesions, and in five cases, the lesions were bilateral. There were no abnormal breast findings in 10 women treated with steroids and azathioprine alone.¹⁴ In one of the two cases reported by Rolles and Calne, there was resolution of the masses after cessation of cyclosporin A therapy. Among the 8 patients with fibroadenomas, 5 patients have taken cyclosporin A and steroid, and 3 patients have received adjuvant azathioprine therapy. None of them had cessation of medication. So we can assess the cyclosporin A and steroid had major effect to breast tissue to promote the fibroadenomas. In none of the reported cases was there an inexorable increase in lesion size necessitating mastectomy.²⁹

The giant fibroadenomas seen in adolescent girls tend to be of the juvenile type, with prominent stromal cellularity, ductal hyperplasia, and stromal collagenation.^{27,28} Some of our patient, the fibroadenomas in kidney transplanted patients with long

term cyclosporin A therapy were of the juvenile type and also demonstrate these proliferative changes.

In imaging analysis, Multiple giant fibroadenomas manifest as well-defined round, oval, or lobulated masses in mammography. With ultrasonography, well-defined, homogeneously hypoechoic solid masses embedded in a highly echogenic stroma (as seen in these cases) have been reported.³⁰ A single supplying vessel has been described in Doppler sonography. In one previously reported case, T1- and T2-weighted magnetic resonance (MR) imaging showed well-circumscribed, encapsulated masses with low signal intensity.²⁵ Dynamic contrast enhanced MR imaging demonstrated rapid enhancement within 1 minute, so that malignancy could not be excluded. In our cases, breast MRI was not done.

In our study, at mammography, the masses were well-defined, round to oval shape, and show unusual higher density than fibroadenomas in patients without cyclosporin A treatment. It might be due to more compact cellularity and prominent stroma of fibroadenomas in transplanted patients. At ultrasonography, well-defined, homogeneous internal echoic mass and relatively high echogenicity were compatible with benign masses. The usual fibroadenomas are commonly show oval shape with low longitudinal/transverse diameter(L/T) ratio, but the fibroadenomas in transplanted patients show high L/T ratio and in Doppler study, they show plenty of blood flows and sometimes penetrating vessels. Those findings made us to rule out the possibility of malignancy.

In case of breast malignancy of transplanted patients showed more schirrhous pattern comparing to usual carcinoma, but it is uncertain those findings were result from cyclosporin A treatment. More prospective and wide range study of transplanted patients with breast lesions will reveal the effect of cyclosporin A to the breast tissue.

We noticed that immunosuppressed patients with long term cyclosporin A therapy have tendency to manifest multiple, bilateral masses and large size. But the limitation of this study is it was not enough to reveal the mechanism of cyclosporin A to breast tissue. More prospective study will be needed for analyze the mechanisms of cyclosporin A to the breast tissue with animal or in vitro study.

In conclusion, the fibroadenoma in transplanted patients with long term cyclosporin A therapy have tendency to develop multiple and bilateral masses. The radiologic findings of the fibroadenomas in immunosuppressed patients were generally compatible with benign mass, but some of the findings were differ to usual fibroadenomas, due to different histologic features of them.

V. Conclusion

The purpose of this study is to assess the breast lesions involving patients with transplanted kidney and to analyze the imaging and pathologic characters of breast lesion. From 1990 to 1999, one thousand four hundred and thirty eight patients underwent renal transplantation in our institute. All patients have received routinely long duration immunosuppressive therapy with cyclosporin A, and steroid after renal allograft. Among them, 486 patients were female. We analyzed twelve women patients who had breast complaints of developed palpable breast mass during chemotherapy, they underwent operation due to breast lesions. So we have results as mentioned below.

1. The pathologic outcomes of 12 patients were as follow : seventeen fibroadenomas(n=9), two DCIS(n=2), one invasive ductal carcinoma(n=1), and bilateral papilloma and papillomatosis(n=1). Six of 12 patients had multiple fibroadenomas(more than two) and among them 5 patients had bilateral fibroadenomas. Mean diameter of fibroadenomas is 4.17 ± 2.5 cm. Mean duration from renal transplantation to histologic confirmation of breast lesions is 4.6yrs(1.7-8.8yrs).

2. Mammographic features of lesions showed spherical shape and well circumscribed margin with unusual high density mass. None of the lesions showed

calcification and spiculation. Sonographic findings of the masses showed relatively high echogenicity with high L/T ratio than usual benign mass, even though, homogeneous internal echo and well circumscribed margin consistent with benign. Almost of them has been rapid growing.

3. Pathologically, the all fibroadenoma specimens showed proliferation of stroma and glandular tissue were diagnostic. Six specimen showed higher cellularity than usual fibroadenoma and two of them showed mitotic feature.

In conclusion, fibroadenomas involving patients with renal transplantation showed tendency to be multiple, bilateral and larger size. They showed rapid growing and spherical shape and unusual higher internal echo and high L/T ratio than usual fibroadenoma. It was probably from high cellularity of fibroadenomas in transplanted patients.

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