

# Unilateral Breast Edema: A Rare Complication of Superior Vena Cava Stenosis in a Patient with Hemodialysis

Soo Hyun Yeo<sup>1\*</sup>, Hyuk Won Chang<sup>1</sup>, Ji Hyoung Cho<sup>2</sup> and Sun Hee Kang<sup>2</sup>

<sup>1</sup>Department of Radiology, Keimyung University College of Medicine, Dong-San Medical Center, Daegu, Korea

<sup>2</sup>Department of Surgery, Keimyung University College of Medicine, Dong-San Medical Center, Daegu, Korea

## Abstract

Unilateral breast edema is caused by a variety of conditions, and rare cause of unilateral breast edema is central vein stenosis in the patient with hemodialysis. In the patient with hemodialysis, subclavian or innominate vein stenosis can rarely cause unilateral breast edema, but the stenosis of junction between superior vena cava (SVC) and right atrium (RA) is very rarely reported. Here we report the pin-point stenosis of junction between SVC and RA presenting as right breast edema in the patient with end-stage renal disease with hemodialysis.

**Keywords:** Unilateral breast edema; Venous stenosis; Superior vena cava; End-stage renal disease; Hemodialysis

## Introduction

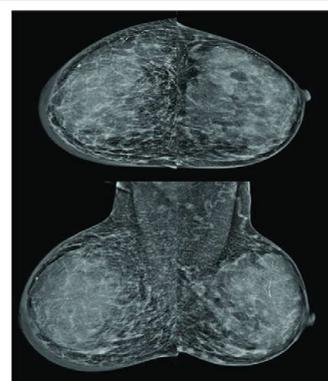
Breast edema results from a variety of benign or malignant diseases such as nephrotic syndrome, congestive heart failure, leukemia, pemphigus, lymphatic obstruction, granulomatous disease, inflammatory breast cancer, post-irradiation, mastitis, fat necrosis or trauma [1]. Usually, breast edema occurs with a systemic disease thus bilateral breast edema is more common than unilateral breast edema. Rare cause of unilateral breast edema includes subclavian or innominate vein stenosis in hemodialysis patients and unilateral breast edema is rarely reported complication of central vein stenosis [2]. Here we present a case of unilateral breast swelling in a hemodialysis patient secondary to the stenosis of junction of superior vena cava (SVC) and right atrium (RA).

## Case Report

A 32-year-old woman was hospitalized for repeated right breast swelling for 6 months. She had a lupus nephritis with underlying systemic lupus erythematosus (SLE) for 10 years. Five years ago, uremia was developed and she underwent right brachiocephalic arteriovenous fistula (AVF) creation for maintenance dialysis, followed by temporary PermCath catheter tunneling at right internal jugular vein for emergent hemodialysis. Past medical history was unremarkable except SLE with lupus nephritis. Physical examination was significant for unilateral right breast swelling without redness, heatness or focal tenderness. Also there showed superficial vein dilatation at the right side chest wall and neck. Physical examination of left breast was unremarkable.



**Figure 1:** Initial Chest X-ray demonstrates marked enlargement of right breast and moderate amount of right pleural effusion.



**Figure 2:** A. Both craniocaudal and medio-lateral oblique mammograms show diffuse increased density with trabecular thickening and marked skin thickening at right breast. B. Ultrasonography of the right breast shows diffuse skin thickening and subcutaneous edema with dilatation of superficial vein without intravenous thrombosis.

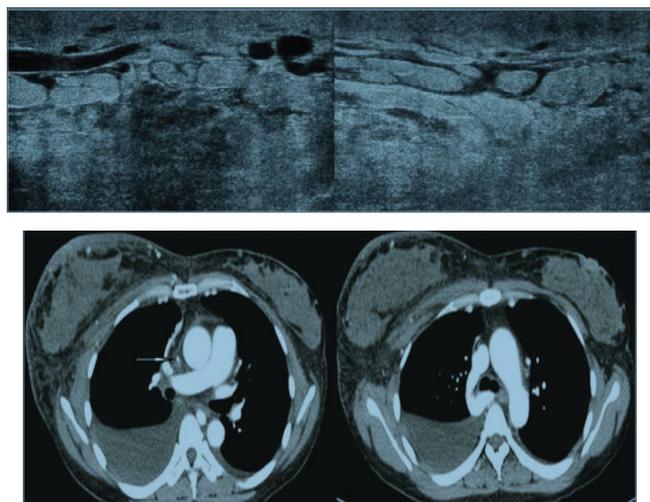
The other physical examination was within normal limits. Vital signs were normal without fever. Laboratory findings were not remarkable, showing white blood cell (WBC) count was normal at the level of  $4.33 \times 10^3/\mu\text{L}$ , erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were within normal range. On the review of her medical history, unilateral right breast swelling developed 6 months earlier, but she didn't visit hospital nor got treatment. The function of AVF was good without bruit, thrill or sign of obstruction. She was evaluated with chest X-ray 2 months earlier in our institution and the chest X-ray showed marked swelling of right breast with moderate amount of right pleural effusion (Figure 1). She had an initial work up done at the department of breast-endocrinology and took mammography with breast ultrasonography to exclude breast pathology such as inflammatory breast cancer (Figure 2). Breast mammography showed

**\*Corresponding author:** Soo Hyun Yeo, Department of Radiology, Keimyung University College of Medicine, Dong-San Medical Center, Korea, Tel: 82-53-250-7770; Fax: 82-53-250-7767; E-mail: [shyeo81@dsmc.or.kr](mailto:shyeo81@dsmc.or.kr)

**Received** June 22, 2016; **Accepted** September 25, 2016; **Published** September 30, 2016

**Citation:** Yeo SH, Chang HW, Cho JH, Kang SH (2016) Unilateral Breast Edema: A Rare Complication of Superior Vena Cava Stenosis in a Patient with Hemodialysis. J Clin Case Rep 6: 870. doi: [10.4172/2165-7920.1000870](https://doi.org/10.4172/2165-7920.1000870)

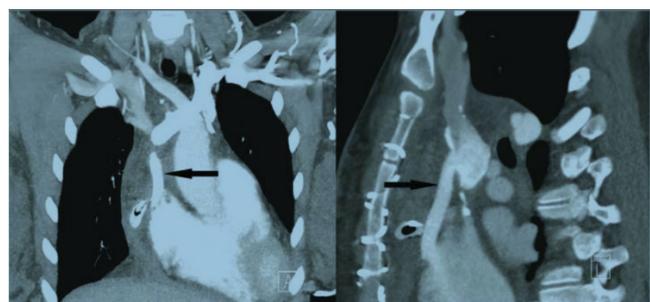
**Copyright:** © 2016 Yeo SH, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



**Figure 3:** A, B Contrast-enhanced chest CT scan demonstrates pin point stenosis (arrow) of the SVC-RA junction with marked dilatation of azygous and hemiazygous veins. Also there shows marked enlargement of right breast with dermal thickening and large amount of right pleural effusion.



**Figure 4:** Maximum-Intensity Projection reconstruction of contrast enhanced upper extremity CT angiogram reveals intact of right innominate vein and subclavian vein without focal stenosis or thrombosis.



**Figure 5:** Multiplanar reconstruction image of the chest reveals intact blood flow through Gore-tex graft (arrows) after bypass surgery between SVC and RA.

marked swelling of right breast with trabecular thickening and skin thickening without detectable microcalcifications or asymmetric densities. Breast ultrasonography revealed diffuse skin thickening and subcutaneous edema in right breast with dilatation of superficial vein without intravenous thrombosis. There were no detectable masses or inflammatory change at both breasts on ultrasonography. Upper-extremity computed tomography (CT) angiogram was performed to exclude central vein stenosis after the negative confirmation of breast

pathology. CT scan revealed pin-point stenosis at the junction of SVC and RA with dilatation of azygous arch, hemiazygous vein and multiple superficial collateral veins (Figure 3). Also there noted large amount of right pleural effusion and subcutaneous edema of the right sided chest wall and breast. Right innominate vein and subclavian vein showed intact without focal stenosis or thrombosis (Figure 4). Because the location of stenosis was at the junction of SVC and RA with 2 cm in length, interventional treatment was not available. So she underwent surgery for SVC-RA bypass using Gore-tex graft (Figure 5). Right breast swelling improved significantly after surgery and resolved completely later (Figure 6).

## Discussion

Although breast edema is worrisome for inflammatory breast cancer, breast edema is the common appearance of several nonmalignant systemic conditions [3]. Systemic causes of breast edema more commonly affect both breasts, unilateral breast edema may also be caused in the condition of mastitis, post-irradiation change, infection, axillary lymphadenopathy, complication of arteriovenous dialysis and venous obstruction [3].

Central venous stenosis or occlusion is a common complication of hemodialysis access, occurring in 19% to 41% of the hemodialysis patients [4]. Depending on the location of the occlusion or stenosis and capacity of collateral flow, there are variable clinical findings such as visible venous collaterals on shoulder or chest wall, painful arm swelling, skin ulceration or tissue loss [4]. In more central vein obstruction, unilateral facial or breast swelling may occur [5].

Since Topf et al. [6] initially reported unilateral breast swelling as a rare complication of central venous stenosis, multiple case reports have been reported and summarized by Blum et al. [7]. Blum et al. [7] reported a case of unilateral breast swelling resulting from left innominate vein stenosis. Also they summarized 7 case reports regarding unilateral breast swelling in the patients with hemodialysis and those were result from the occlusion or stenosis of subclavian vein, brachiocephalic vein or left innominate vein. To the best of our knowledge, this is the first report regarding unilateral breast swelling caused from the stenosis of junction of SVC and RA.

Superficial veins of the breast form an anastomotic circle around the nipple. Lateral thoracic vein and internal mammary vein which drain into axillary vein are the draining veins of the breast from the circle of superficial vein and deep veins of the breast. Axillary vein drains into the innominate vein through subclavian vein. Therefore,



**Figure 6:** Chest X-ray after bypass surgery reveals normalization of right breast swelling and resolution of right pleural effusion.

stenosis or occlusion of the innominate vein can lead to ipsilateral breast edema [8].

Central vein stenosis or occlusion may occur from thoracic inlet syndrome, previous clavicular fracture, extrinsic compression or pacemaker wires. But, the majority of patients presenting with central vein occlusion have a history of central vein catheterization for temporary or permanent hemodialysis [9]. Central vein stenosis in the patients with hemodialysis is caused by chronic endothelial trauma resulting from minimal movements of the catheter against the vessel wall, that possibly could enhance thrombophlebitic reactions due to catheter-adherent fibrin sheaths and biofilms. For the temporary catheterization in the patient with hemodialysis, right internal jugular vein which has a straighter course to the RA could be catheterized and it is associated with a lower risk of central vein stenosis than left internal jugular vein or subclavian vein catheterization [9].

For central vein catheterization, the mostly recommended site of the puncture is right internal jugular vein (IJV), because right IJV is so close to the skin that is easy to access and to guide by imaging tools. Also it has nearly straight course from the puncture site to the RA that cause least catheter associated thrombosis or stenosis among the central veins. To the best of our knowledge, this is the first report regarding proximal SVC stenosis presenting unilateral breast edema in the patient with hemodialysis who had a history of temporary right IJV catheterization. It is uncertain why unilateral right breast edema rather than bilateral breast edema occurs in this case, one possible explanation could be the increased venous hypertension caused by ipsilateral AVF creation. In most cases stenosis or occlusion by itself can lead to breast swelling without AVF placement. But in some certain cases, placing an AVF can lead to ipsilateral breast swelling by increasing venous hypertension and interstitial edema [8].

In conclusion, when the patient present unilateral breast swelling

or enlargement, it is helpful for radiologists to know patient's clinical history, previous procedures and detailed knowledge of unilateral breast swelling for the accurate diagnosis. It is important to exclude malignancy of the breast in the patient with unilateral breast edema using mammography with ultrasonography first. But in hemodialysis patient with history of central vein catheterization, central vein stenosis including the proximal portion of SVC should be considered in the differential diagnosis.

#### References

1. Kwak JY, Kim EK, Chung SY, You JK, Oh KK, et al. (2005) Unilateral breast edema: spectrum of etiologies and imaging appearances. *Yonsei Med J* 46: 1-7.
2. Tekbas G, Oguzkurt L, Gurel K, Ozkan U, Gur S, Onder H (2011) Is unilateral breast enlargement always a sign of cancer? *Hemodial Int* 15: 553-558.
3. Cao MM, Hoyt AC, Bassett LW (2011) Mammographic signs of systemic disease. *Radiographics* 31: 1085-1100.
4. Miller GA, Friedman A, Khariton A, Jotwani MC, Savransky Y (2010) Long thoracic vein embolization for the treatment of breast edema associated with central venous occlusion and venous hypertension. *J Vasc Access* 11: 115-121.
5. Mickley V, Gorich J, Rilinger N, Storck M, Abendroth D (1997) Stenting of central venous stenoses in hemodialysis patients: long-term results. *Kidney Int* 51: 277-280.
6. Topf G, Jenkins P, Gutmann FD, Rieselbach RE, Saltzstein EC (1977) Unilateral breast enlargement. A complication of an arteriovenous fistula and coincidental subclavian vein occlusion. *JAMA* 237: 571-572.
7. Blum C, Baker M (2008) Venous congestion of the breast mimicking inflammatory breast cancer: Case report and review of literature. *Breast J* 14: 97-101.
8. Yalavarthy U, Agrawal VK, Showkat A (2011) Unilateral breast swelling as a complication of innominate vein stenosis in a hemodialysis patient. *Clin Nephrol* 75(1): 56-59.
9. Mickley V (2006) Central vein obstruction in vascular access. *Eur J Vasc Endovasc Surg* 32: 439-444.