



# Transcatheter Arterial Embolization for the Control of Neoplastic Hemorrhage in Locally Advanced Breast Cancer: A Case Report

국소 진행성 유방암에서의 종양성 출혈에서의  
경도관 동맥색전술을 이용한 치료: 증례 보고

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Received May 18, 2024  
Revised July 13, 2024  
Accepted August 4, 2024  
Published Online January 21, 2025

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Intractable bleeding from locally advanced breast carcinoma is a rare but challenging clinical problem. Given the patients' poor overall condition and palliative care status, management options are often limited. Transcatheter arterial embolization (TAE) emerges as a potential alternative to traditional surgical or radiation-based approaches for hemorrhage control. This case report presents a successful application of TAE in managing spontaneous bleeding from a locally advanced breast cancer.

**Index terms** Breast Neoplasms; Hemorrhage; Therapeutic Embolization; Angiography

## INTRODUCTION

Although rarely reported, intractable hemorrhage from locally advanced breast carcinoma is a potentially life-threatening condition that poses a significant clinical challenge. Transcatheter arterial embolization (TAE) is a safe and minimally invasive technique established for hemorrhage control in various solid tumors (1). However, the use of TAE to manage severe hemorrhage secondary to breast cancer remains underreported (2, 3). Here, we present a case of intractable hemorrhage resulting from locally advanced breast cancer that was successfully treated with TAE.

## CASE REPORT

The patient was a 54-year-old woman with a history of right total mastectomy for breast cancer 10 years prior. Two years before presentation, she discovered a palpable left breast mass but deferred diagnostic evaluation and treatment. Subsequent evaluation revealed a large (20 cm) infiltrative left breast mass extending through the overlying skin and chest wall musculature. Multiple hematolymphangitic metastases were identified in various sites, including bone and lung. Chemotherapy was initiated, resulting in mass reduction.

However, one year after treatment initiation, the patient presented to the emergency department with acute left breast bleeding. Her blood pressure was 83/49 mmHg, and her hemoglobin level was 7.6 g/dL. Initial attempts at hemostasis using manual compression failed. Two units of packed red blood cells were transfused without inotropes, elevating blood pressure to 106/65 mmHg. The patient declined hemostatic radiotherapy, leaving TAE as the only viable option for hemorrhage control.

Contrast-enhanced CT revealed a large, approximately 12 cm infiltrative mass in the left breast, with prominent branches of the left internal thoracic and subclavian arteries adjacent to it (Fig. 1A). A retrograde approach via the right common femoral artery was employed to introduce a 5 Fr arterial access sheath under local anesthesia. Selective arteriography of the left internal thoracic artery was performed using a 5 Fr catheter (Headhunter, Terumo, Tokyo, Japan). Angiography demonstrated a tumor blush with a feeding artery originating from the left internal thoracic artery (Fig. 1B). Selective catheterization of the feeding artery using a 1.9 Fr coaxial microcatheter (Progreat; Terumo) was followed by embolization with polyvinyl alcohol (PVA) particles (PVA Foam Embolization Particles, Cook Medical, Bloomington, IN, USA) ranging from 350–500  $\mu$ m (Fig. 1C). Subsequent left subclavian artery angiography revealed multiple tumor feeders supplying an extensive tumor stain (Fig. 1D). Each feeding artery was selectively catheterized and embolized with PVA particles (Fig. 1E, F). Post-embolization, blood pressure stabilized at 112/74 mmHg, and hemoglobin level increased to 10.1 g/dL.

Two days post-embolization procedure, the patient developed fever and pain, which were managed with analgesics. Hemodynamic stability and hemoglobin levels (10.3 g/dL) were maintained over the following week, with complete cessation of active bleeding. Residual spot bleeding was controlled with manual compression. The patient was discharged and scheduled for chemotherapy. An 18-month follow-up CT demonstrated a significant reduction of the left breast mass following additional chemotherapy. The patient remains stable without recurrent bleeding.

The Institutional Review Committee of our institution (IRB No. 2024-04-046) approved the study, and informed consent was waived due to the study's retrospective nature.

## DISCUSSION

Hemorrhagic complications affect approximately 10% of advanced cancer patients. Bleeding can arise from various factors, including direct tumor vascular invasion, antineoplastic therapies, systemic coagulopathies, and localized infections (1, 4). While uncommon, breast cancer-related hemorrhages can be catastrophic in advanced cutaneous or chest wall in-

**Fig. 1.** Controlling neoplastic hemorrhage from locally advanced breast cancer through transarterial embolization in a 54-year-old female.

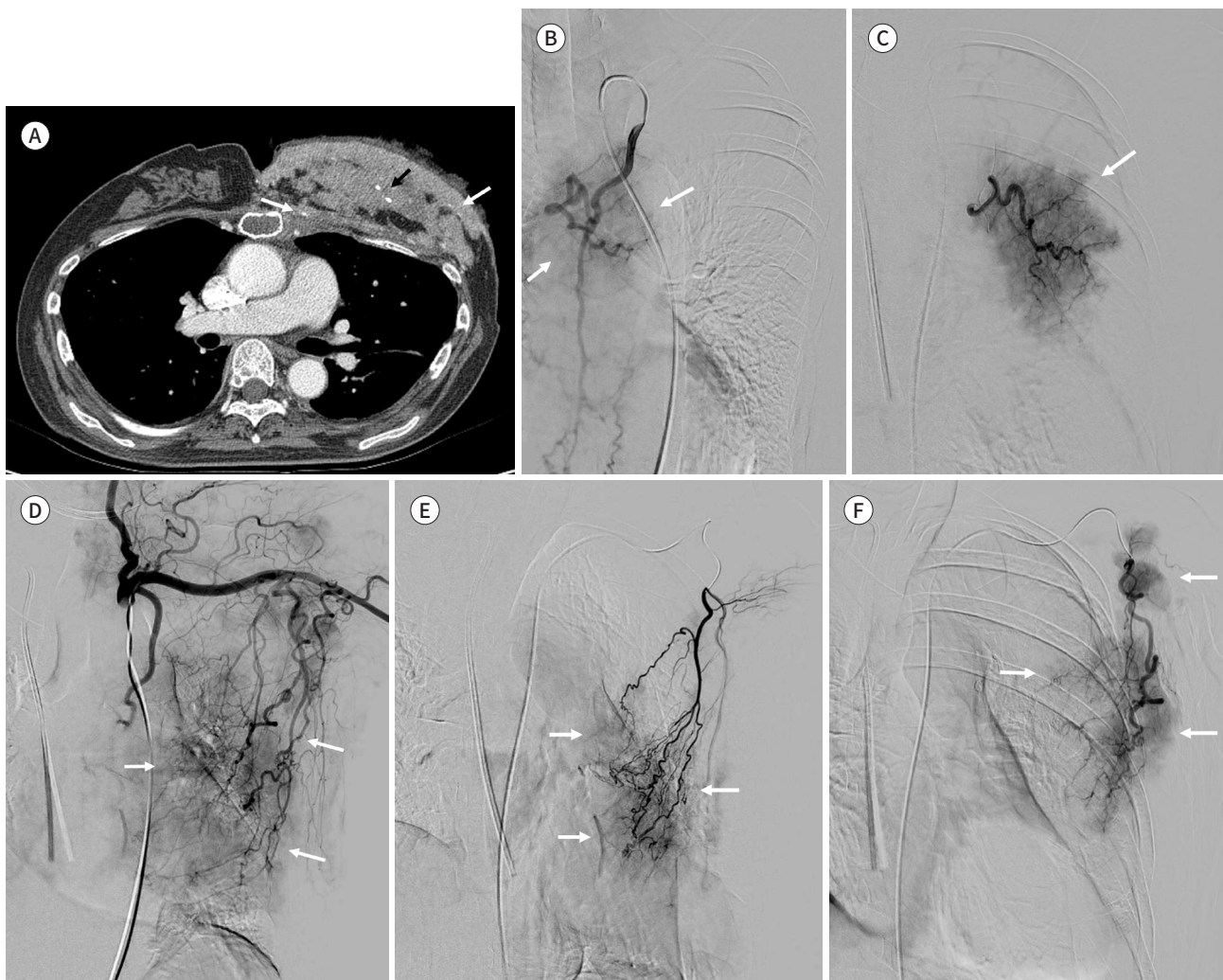
**A.** Axial contrast-enhanced CT scan demonstrates a significant, 12 cm infiltrative mass within the left breast, accompanied by prominent branches of the left internal thoracic artery and left subclavian arteries adjacent to the mass (white arrows). Small calcifications are present within the mass (black arrow).

**B.** Digital subtraction angiogram of the left internal thoracic artery in the left anterior oblique projection (20°) shows a hypervascular blush of the left breast cancer (arrows).

**C.** Selective angiogram of the feeding artery from the left internal thoracic artery in a right anterior oblique projection (25°) reveals an intense tumor blush (arrow), with embolization of the tumor feeder performed at this site.

**D.** Digital subtraction angiogram of the left subclavian artery in the anteroposterior projection demonstrates an extensive tumor stain supplied by multiple tumor feeders (arrows).

**E, F.** Selective angiograms of the pectoral branch of the thoracoacromial and lateral thoracic arteries in the right anterior oblique projection (30°) show a hypervascular tumor blush in the left breast cancer (arrows). Embolization was performed with polyvinyl alcohol particles (350–500  $\mu$ m).



involvement. The breast's arterial supply primarily originates from the internal thoracic artery (approximately 60%), with additional contributions from the lateral thoracic, intercostal, and axillary arteries.

Treatment selection for hemorrhagic complications necessitates individualized consideration of patient characteristics, including hemodynamic stability, life expectancy, and preferences (1). Manual compression, though common, has limitations. Surgery is often impractic-

cal, especially in palliative care settings, due to patient prognosis and the risk of vessel fragility in advanced breast cancers (2). Hemostatic radiotherapy may be suitable for superficial lesions but requires hemodynamic stability and delayed onset of action (4). Endovascular procedures offer a less invasive and safer alternative, achieving hemostasis in 70%–99% of appropriate palliative cases (4, 5).

TAE for bleeding control typically involves embolic materials to induce temporary or permanent vessel occlusion. Embolic material selection considers disease process, underlying etiology, vascular anatomy, and clinical/technical endpoints. A range of embolic agents, from temporary gelfoam to permanent microspheres, PVA, coils, and liquid embolics, have been used for malignancy-related bleeding (5). Permanent particulate agents excel in blocking distal vascular beds for cancer-related hemorrhage. Aksoy et al. (3) reported a case of recurrent breast cancer with severe bleeding treated by embolizing multiple feeders, including costocervical branches and the internal thoracic artery, using microspheres. For severe hemorrhage from large arterial damage, stent grafts are also considered. Ugras et al. (6) described a case of breast cancer-induced severe bleeding attributed to an axillary artery pseudoaneurysm, successfully treated with an endovascular stent graft.

While TAE is generally safe, complications like hematoma, vessel stenosis/occlusion, infection, and necrosis can occur. Postembolization syndrome, characterized by fever and pain, is common but usually resolves with supportive care (4, 5). Long-term TAE complications remain unclear due to the limited life expectancy of target patients. Careful embolic material selection and angiographic control minimize complications (7, 8).

In conclusion, although locally advanced breast cancer is a rare condition, it can cause life-threatening bleeding that necessitates a multidisciplinary approach to management. As demonstrated in our case, TAE represents one of several treatment options available, and in certain cases, it may be the safest and most effective approach. This treatment modality offers the potential for rapid recovery with minimal discomfort. Consequently, TAE emerges as a viable management strategy for controlling bleeding in palliative care patients with advanced cancer and may also be utilized for symptom relief and treatment.

### Author Contributions

Investigation, K.J.H., A.D.Y.; supervision, H.H.P.; validation, H.H.P.; visualization, K.J.H., K.M.S.; writing—original draft, K.J.H., A.D.Y.; and writing—review & editing, K.M.S.

### Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

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### Funding

None

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## 국소 진행성 유방암에서의 종양성 출혈에서의 경도관 동맥색전술을 이용한 치료: 증례 보고

강지환 · 김명섭\* · 홍현표 · 안도연

진행된 유방암에서의 심각한 자발성 출혈은 드물게 보고되나, 처치하기 어려운 문제 중 하나이다. 특히, 이 경우 환자들은 전신 상태가 불량하거나 완화치료(palliative care) 단계인 경우가 많은데 이러한 점이 지혈을 위한 치료 선택을 더욱 까다롭게 한다. 이러한 상황에서 고식적 수술이나 방사선 요법은 해결책이 되지 못하는 경우가 있는데, 위 치료법에 대안으로 경도관 동맥 색전술(trans catheter arterial embolization)이 효과적인 대안이 될 수 있다. 이에 저자들은 진행된 유방암에서 발생한 자발성 출혈 사례를 경도관 동맥 색전술을 통하여 성공적으로 지혈한 사례를 제시하고자 한다.

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