Supraumbilical Skin Rash and Fat Necrosis After Transcatheter Arterial Chemoembolization: A Case Report

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We report the case of a 63-year-old female who had chronic hepatitis C and who was diagnosed with hepatocellular carcinoma. Hepatic angiography showed one visible and tortuous falciform artery arising as the terminal branch of the left hepatic artery. Transcatheter arterial chemoembolization (TACE) was performed via the left hepatic artery. The patient developed supraumbilical skin rash with local tenderness on the following day. After supportive treatment by a dermatologist, the skin rash subsided gradually with sequelae of irregular skin surface and one small subcutaneous nodule. Skin biopsy of the lesion 1 year later showed fat necrosis with foreign body reaction and fibrosis. We discuss this rare complication of TACE and review the literature.

Key Words: falciform artery, transcatheter arterial chemoembolization, hepatocellular carcinoma
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Transcatheter arterial chemoembolization (TACE) has been widely used to treat malignant liver tumors. By interrupting the arterial supply, chemoembolization deprives the tumor of its major nutrient source and allows for prolonged retention of tumoricidal agent within the tumor, resulting in extensive tumor necrosis. A wide spectrum of complications after TACE have been reported [1,2]. A rare complication of TACE is supraumbilical skin rash caused by the flow of the chemotherapeutic agent into the hepatic falciform artery (HFA). We report such a case and review the literature.

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Case Presentation

A 63-year-old female patient with chronic hepatitis C received regular follow-up at Chia-Yi Christian Hospital, Taiwan, for 20 years. She had previously undergone hysterectomy for uterine myoma and focal excision for bilateral breast fibromas. A liver nodule about 2 × 2 cm at S4 was discovered on sonography, computerized tomography (CT) and magnetic resonance imaging (MRI) at Chia-Yi Christian Hospital in October 2001. She was referred to our institution 2 months later. Under the impression of hepatocellular carcinoma, angiography was arranged for further survey and treatment. Celiac arteriography showed a small hypervascular nodule fed by the left hepatic artery. One obvious falciform artery arising from the left hepatic artery was also identified (Figure 1). TACE was carried out via the left hepatic artery with infusion of 4 mL of lipiodol (Lipiodol Ultra-Fluide, Guerbet, Aulnay-sous-Bois, France)

Figure 1. *Arterial phase of the left hepatic arteriogram showing one hypervascular stain (arrowhead) at S4 and a dilated falciform artery (arrow) arising from the left hepatic artery.*

mixed with 30 mg of epirubicin and 6 mg of mitomycin-C, followed by arterial feeder devascularization using gelatin sponge (Gelfoam, Pharmacia and Upjohn, Kalamazoo, MI, USA). The falciform artery could not be left out of the arterial chemoembolization due to technical difficulty.

The next day, after TACE, the patient complained of abdominal pain; physical examination revealed a supraumbilical skin induration (Figure 2). The induration was associated with tenderness and measured about 10 × 13 cm. No fever was noted. The skin lesions were confined mainly to the left of the midline and below the xiphoid. One month after TACE, CT showed remarkable thickening of the supraumbilical skin, with increased density and infiltration of associated subcutaneous fat (Figure 3A). The connective tissue along the tract of the falciform artery was expanded with infiltration (Figure 3B). Oral nonsteroidal anti-inflammatory drugs and focal infrared laser treatment were given. The skin rash and focal tenderness over the

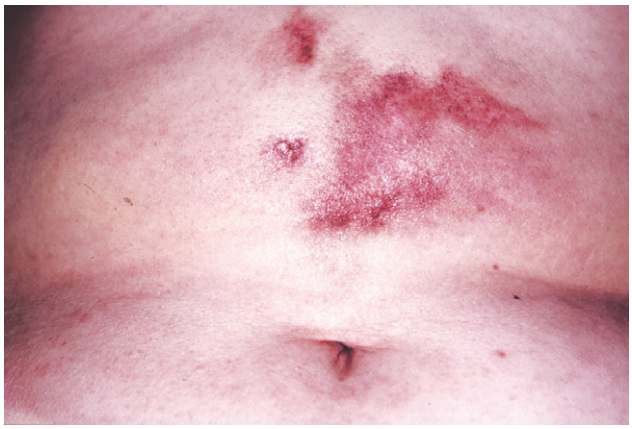

Figure 2. *Painful skin induration in the supraumbilical region.*

supraumbilical region subsided gradually. Three months later, CT showed that the lesion in the subcutaneous fat layer was smaller (Figure 3C). The subcutaneous nodule measured about 2 × 2.6 × 2.7 cm 1 year later (Figure 3D). Skin biopsy showed fat necrosis with foreign body reaction and fibrosis.

Discussion

The HFA arises as one or two small terminal branches of the left or middle hepatic artery [3]. Delayed and persistent opacification of the HFA on hepatic angiograms, caused by its slow blood flow, is considered the key to its angiographic identification [4]. Anatomically, the HFA runs within the falciform ligament and distributes itself around the umbilicus. A review of published papers shows incidences of angiography-visible falciform arteries ranging from 2% to 67.2% [3,5,6]. At our institution, a retrospective study of 100 cases estimated the incidence of angiography-visible falciform arteries as approximately 3% (unpublished data).

Preventive embolization of the HFA before TACE remains controversial. Kim et al reported that 16 patients with an HFA had no complications after chemoembolization [6]. However, supraumbilical skin rash was reported on several occasions [3,4,7–9]. Williams et al presented a case with supraumbilical skin rash after intra-arterial chemotherapy [3]. The falciform artery was ligated and chemotherapy for the patient was resumed without incident.

The HFA and the subcutaneous artery can be anastomosed directly or via the ensiform branch of the internal thoracic artery [8,10]. An enlarged falciform artery may be

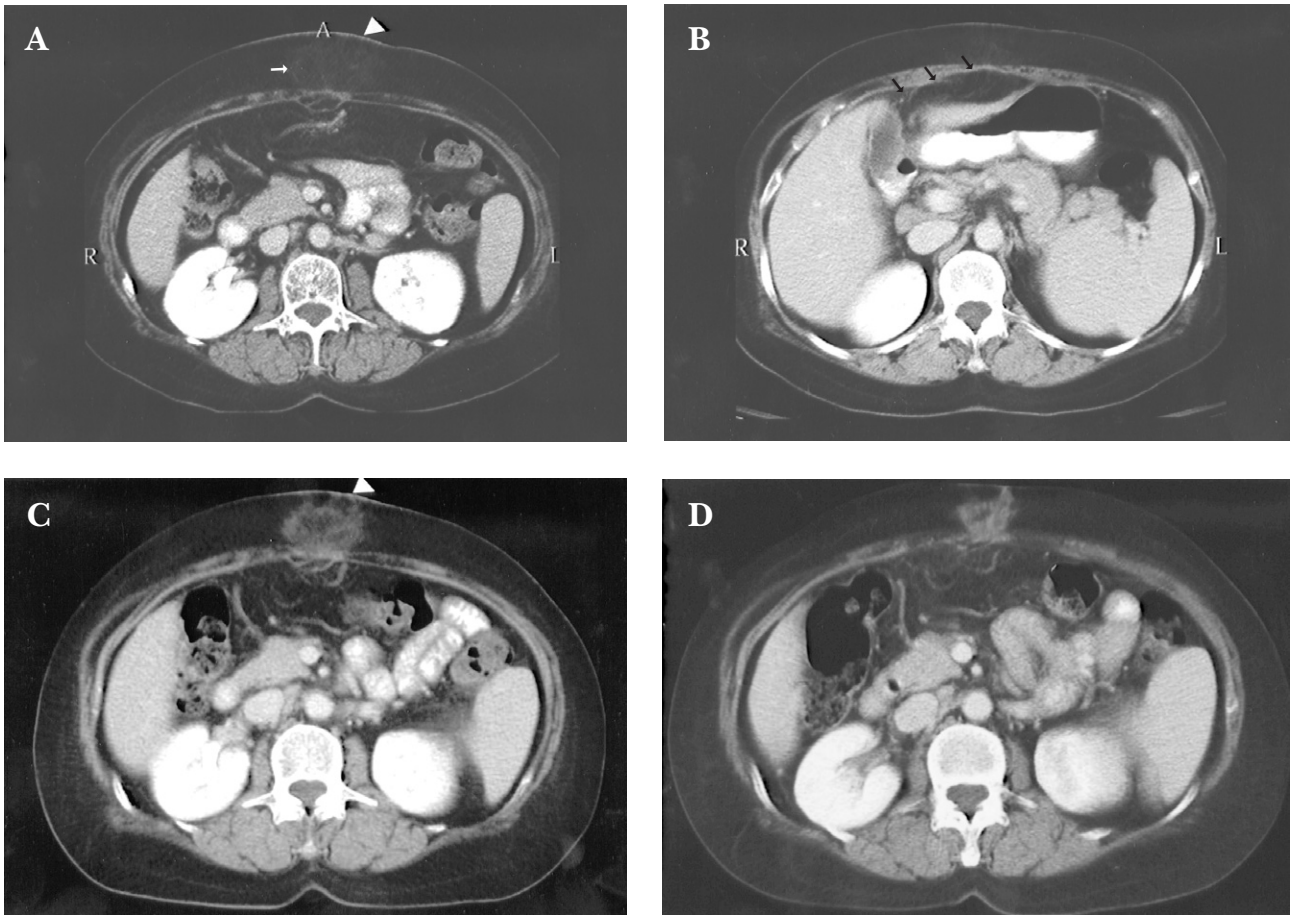

Figure 3. *(A) Axial computerized tomography (CT) image with contrast enhancement 1 month after transcatheter arterial chemoembolization (TACE) shows thickening of the supraumbilical skin (arrowhead) associated with increased-density subcutaneous fat (arrow). (B) Axial CT image obtained 7 cm cranial to that in (A). The connective tissue along the falciform ligament (arrows) is expanded with infiltration and the left hepatic lobe is downwardly displaced. (C) Axial CT image with contrast enhancement 3 months after TACE. Interval shrinkage of the affected skin area (arrowhead) and a subcutaneous high-density nodule are evident. (D) Axial CT image with contrast enhancement 1 year after TACE. The subcutaneous high-density nodule measures about 2 × 2.6 × 2.7 cm. The supraumbilical skin remains thickened but is significantly decreased in surface area.*

associated with adhesions around the HFA after laparotomy or with stenosis/occlusion of the hepatic artery [3,7]. In our case, focal excision of bilateral breast fibromas and previous abdominal total hysterectomy may have interrupted the network between the HFA and the superior epigastric artery/internal thoracic artery, enlarging the HFA. Thus, the infusion of chemotherapeutic agents through the HFA may be the likely cause of the skin rash. Microscopic findings of fat necrosis with foreign body reaction in this lesion supported this proposal.

We propose that the hemodynamic state between communication of the falciform artery and the internal thoracic artery/superior epigastric artery may be the key factor as to whether a supraumbilical skin rash may occur. If the falciform artery cannot be left out of the chemoembolization and the previous medical history suggests possible enlargement of the HFA, we recommend preventive falciform artery embolization to avoid skin complications.

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