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Application of Transcatheter Arterial Chemoembolization (TACE) and Transarterial Chemoinfusion (TACI) in Sarcoma: A Case Series

Adrian Tangkilisan,[1] Wega Sukanto,[1] Christa Tamburian,[1] Gerald R. Lolongan[2]

[1]Division of Thoracic and Cardiovascular Surgery, Department of Surgery, Faculty of Medicine, Universitas Sam Ratulangi – Prof. Dr. R. D. Kandou Hospital, Indonesia
[2]Department of Surgery, Faculty of Medicine, Universitas Sam Ratulangi, Manado, Indonesia
Email: geraldrandylolongan@gmail.com
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Abstract: Sarcomas are rare cancers with a dismal prognosis, and are still a great challenge for surgeons. Moreover, the development of treatment methods for sarcomas is currently heterogeneous. Transcatheter arterial chemoembolization (TACE) is a procedure that combines embolization and transarterial infusion chemotherapy (TACI). It targets the tumor bed with high doses of cytotoxic medicines while also inducing ischemia necrosis through arterial embolization. We presented a case series of patients treated with TACE and TACI for sarcoma. Two male patients with soft tissue sarcoma treated at Prof. Dr. R. D. Kandou Hospital, Manado. A 48-year-old male patient presented clinically with pain sensation and venectation in the right chest area, was diagnosed with thoracic soft tissue sarcoma. Another 72-year-old male complained of a painful lump and ulcers at the right flank area was diagnosed with right flank sarcoma. Both of these patients underwent the TACE and TACI procedure. Treatment outcome was assessed by examining the clinical morphology of the lesions and which showed a significant tumor reduction. According to the medical literature, TACE and TACI can benefit some patients, but TACE therapy's effectiveness in treating advanced STS, however, remains debatable. In conclusion, TACE and TACI were used as therapies in the two cases described, with a focus on the most recent developments and discussion of the need for more research to increase the efficacy of therapies.
Keywords: transcatheter arterial chemoembolization; transarterial infusion chemotherapy; sarcoma

INTRODUCTION

Sarcomas make up <1% of all cancers. Sarcomas affect 2-4 persons per 100,000 people, and their >60 subtypes can be grouped into soft tissue and bone sarcomas (STS) and bone sarcomas[1]. Soft tissue sarcomas (STS) are a diverse collection of illnesses that can affect any portion of the body, despite the fact that they often first manifest in the extremities. Although there are several subtypes, the therapy concepts are generally the same. The most common therapy approach is still surgery.[2] Unresectable soft tissue and bone sarcomas (STS) are treated with transarterial chemoembolization (TACE), which is also employed as a pre-surgical adjuvant therapy.[3]

TACE is a combination of transarterial chemoinfusion (TACI) and embolization. Yamada et al. employed transarterial chemoembolization (TACE) for the first time to treat hepatocellular carcinomas in the late 1970s, and it was shown to be effective in the treatment of cancer. Particularly for palliative care or pre-embolization in limb salvage surgery, TACE has been utilized to treat STS. TACE therapy's effectiveness in treating advanced STS, however, remains debatable.[4,5]

This case series was approved by the Ethics Committee of our institute. Before this study was performed, all participants provided informed consent forms, which were signed by each patient.

CASE PRESENTATION

TACE procedures were completed by a Thoracic, Cardiac, and Vascular surgeon, with more than 5 years of experience in invasive therapy, respectively. Briefly, the procedure was done under local anesthesia by injecting 5 cc of lidocaine near the right femoral artery. Super-selection catheter (Progreat, Terumo, Tokyo, Japan) was inserted until the tip reached the proximal site of the feeding artery. Chemotherapeutic agents were injected into the feeding artery at, followed by a careful infusion of embolic materials under angiographic monitoring. TACE was ended when either the feeding vessel showed complete stasis or the angiographic tumor stain disappeared.

This case series reported two male patients with soft tissue sarcoma treated at Prof. Dr. Kandou Hospital Manado. A 48-year-old male patient presented clinically with pain sensation and venectation in the right chest area was diagnosed with thoracic soft tissue sarcoma. Another a 72-year-old male complained of painful lump and ulcers at right flank

Case 1: A 48-year-old male patient came to RSUP Prof. Kandou presented clinically with pain sensation in the right chest area. He denied history of trauma. Family and social history was unremarkable. Due to past medical history pasient had performed left nefrectomy. On examination he was fully alert,afebrile with stable vital sign. There was swollen and venectation on rignt chest area. Lab investigation revealed Leucocyte of 9.3 x 10^9, hemoglobin 8.4 g/dl, Albumin 2.98. Patient was diagnosed with thoracic soft tissue sarcoma and anemia. Patient was transfused with two unit of packed red cell and consented for TACE/TACI procedure. After the procedure, the patient was assessed by examining the clinical morphology of the lesions which showed a significant tumor reduction (Fig, 1, 2)

Case 2: A 72-year-old male presented to our tertiary facility complained of painful lump and ulcers at right flank area. Upon initial examination he was fully concious, not pale, not jaundice and not cyanotic. On local examination there was mass on right flank area measuring 17x16x8 cm. The patient was diagnosed with a right flank sarcoma, presenting with significant cancer-related pain. Interventional treatment with Transarterial Chemoembolization/Chemoinfusion (TACE/TACI) was planned. Following the TACI procedure, a notable reduction in tumor mass was observed, accompanied by a visible decrease in erythema and soft tissue edema surrounding the tumor site.

DISCUSSION

Soft tissue sarcoma (STS) of the thoracic region represents a rare and heterogeneous group of malignancies, often presenting with non-specific symptoms such as localized pain or swelling.[6]

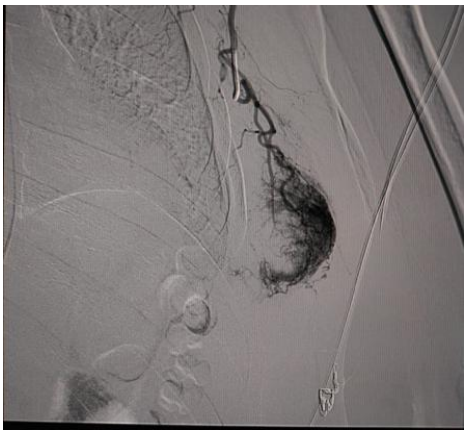

Figure 1. Case 1. Before embolization

Figure 2. Case 1. After embolization

In this case, a 48-year-old male presented with right-sided chest pain and a visible mass without any preceding trauma. The absence of trauma and an unremarkable family or social history, combined with imaging and clinical features, led to the diagnosis of thoracic soft tissue sarcoma. Interestingly, the patient had a history of left nephrectomy, which may have contributed to baseline functional compromise and influenced the decision-making process for further intervention. Post-procedural assessment of this patient revealed a marked clinical reduction in tumor mass and associated symptoms, including decreased swelling and discomfort. This aligns with previous studies reporting that TACE/TACI can achieve effective local tumor control with fewer systemic side effects compared to systemic chemotherapy. The mechanism involves selective catheterization of tumor-feeding arteries, enabling high local concentrations of chemotherapeutic agents while minimizing systemic exposure and toxicity. In the present therapy of sarcomas, therapeutic method development is variable and heterogeneous. Furthermore, only 70% of STS patients are candidates for surgery, leaving the other 30% of patients to receive only conservative therapy.[7]

In the second case, TACI was performed as a palliative intervention for a patient with a right flank sarcoma presenting with pain and inflammatory changes in the surrounding soft tissue. Given the tumor size and ulcerative presentation, surgical resection in the acute setting was deemed high-risk, particularly considering the extensive local inflammation and soft tissue involvement. Moreover, the patient experienced cancer-related pain, which significantly affected his quality of life. In such scenarios, palliative and neoadjuvant options are considered to alleviate symptoms, control local progression, and possibly reduce tumor burden before surgery. Post-procedural evaluation demonstrated a reduction in tumor burden, which was associated with the resolution of localized erythema and soft tissue swelling, suggesting a favorable local response to intra-arterial chemotherapy.

The TACE has proven as an effective treatment for unresectable STS, with a 32.5 % 3-year survival rate. Chemoembolization, as opposed to chemoinfusion alone, can effectively lessen cancer pain and increase tumor relapse intervals.[4] Transcatheter intraarterial chemotherapy infusion (TACI) is an image-guided local, localized treatment used to treat primary or metastatic tumors. Intraarterial administration results in a greater tissue concentration than intravenous delivery. Following intraarterial injections, medication concentration on tissue is influenced by blood flow, injection parameters, and vascular geometry.[5,8] A reported study found that intraarterial injection boosted medication concentration in the tumor by 50 times compared to intravenous administration. Increased local drug concentration will result in a greater therapeutic response, which is the justification for regional chemotherapy. Breast cancer, glioblastoma multiforme, and liver cancer are just a few of the malignancies for which this treatment has been used.[9]

Especially for palliative care or pre-embolization in limb salvage surgery, TACE has been utilized to treat STS. TACE therapy's effectiveness in treating advanced STS, however, remains debatable. In this case series, both of the patients were treated with TACE-TACI procedure and

waiting for further surgery in view of residual disease. Post-procedural assessment revealed significant clinical improvement, including a marked reduction in tumor volume and a decrease in peritumoral erythema and edema. These findings are consistent with previous studies, which have demonstrated that TACI can provide effective local control and improve quality of life in patients with bulky STS lesions. Additionally, regional chemotherapy may facilitate subsequent surgical intervention by downstaging the tumor and delineating viable from necrotic tissue planes. The success of TACE/TACI depends on factors such as vascular anatomy, tumor perfusion, and appropriate chemotherapeutic selection. In this case, the favorable clinical response highlights the role of interventional radiology as an integral part of the multidisciplinary management of soft tissue sarcomas, especially when curative surgery is not immediately feasible.[10]

CONCLUSION

The application of TACE and TACI in this case series highlights their potential roles as effective bridging and palliative therapies in advanced or unresectable sarcomas. By improving local drug delivery and symptom control, these transarterial approaches may complement existing treatment strategies, particularly in patients awaiting definitive surgical management.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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