LETTER / Oncology

Hemorrhage due to radiation-induced sarcoma of the mandible: Treatment with percutaneous cryotherapy

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Several treatment options are currently available for tumors causing repeated moderate or severe bleeding. After failure of local medical treatments, surgical ligation of the feeding arteries should be considered. Percutaneous arterial embolization is also a technique of choice, which can be performed in the interventional radiology suite [1]. In these situations, percutaneous treatments under radiological control, such as sclerotherapy and cryotherapy, are now in full development [2].

Cryotherapy is currently regarded as a curative method, either for percutaneous destruction of tumors and for palliative and analgesic purposes. The advantage of cryotherapy is that it is a minimally invasive and relatively painless procedure that carries little risk [3].

We describe herein the first reported case on the use of cryotherapy for hemostatic purposes in oncology.

Case report

A 67-year-old woman with a past history of squamous cell carcinoma of the right lateral edge of the tongue, treated ten years before with pelvislissomandibulectomy and radiotherapy, has been followed up for five years for radio-induced sarcoma in contact with the right horizontal branch of the mandible. The patient was in the palliative phase and had prior repeated episodes of endobuccal bleeding at the tumor site complicated by chronic anemia. Cervico-facial computed tomography (CT) examination before and after intravenous administration of iodinated contrast material identified a vascular nidi in the mandibular sarcoma with no extravasation (Fig. 1). A tight stenosis > 80% in the ipsilateral common carotid artery was present (Fig. 2).

Because of symptoms of repeated bleeding and their clinical consequences, selective embolization of the tumor site was discussed during a multidisciplinary meeting. This procedure however was contraindicated because of the tight ipsilateral common carotid artery stenosis. In the same time, surgery was not considered because of the patient’s general condition and the infiltrative hypervascularized nature of the sarcoma. Hemostatic percutaneous cryotherapy centered on the tumor vascular nidi under neuroleptic analgesia was thus decided because no alternate treatment options could be performed.

The procedure was performed under conscious sedation. A landmark image was defined on enhanced CT-scan (Fig. 1) to identify the target area, with a vascular bundle in the tumor area. After local anesthesia using a 22-G needle, a cryotherapy needle (Ice Seed® Cryoprobe, Galil Medical, Arden Hills, MN, USA) was positioned under CT guidance into the hypervascular area that was assumed to be at risk of bleeding (Fig. 3). A right inferior mandibular angle approach was chosen because of a direct access to the selected target and no needle repositioning was needed. The skin was protected with a warm water bag to avoid any freezing-induced damage. Cryoablation treatment was performed with two complete cycles of freezing of 10 minutes each separated by a 10 minute thawing (9 minutes passive and one minute active). The total cryoablation time was 40 minutes. During the freezing phase a control image was obtained at 8 minutes cooling in each cycle to visualize and monitor ice formation and check for correct positioning of the needle. The Ice Seed® needle was gently removed after control CT examination. During the immediate postoperative period, the patient was given analgesic drugs for three days but no other measures were taken. No hematoma formation, no postoperative edema or pain was reported following the procedure. The skin condition was preserved by placing a warm water bag on the skin located adjacent to the cooling area.

The patient was clinically evaluated at 15 days postoperative and then at one and six months after the procedure. She reported no further bleeding. Skin condition was entirely preserved. In the same time, repeat CT two after the procedure showed no complications due to cryotherapy (Fig. 4).

Discussion

There are different alternative treatments for a tumor causing repeated moderate or severe bleeding [1]. After medical treatments (local care) have failed to stem the bleeding, surgery is the conventional technique with ligation of the feeder arteries responsible for the bleed. Percutaneous endovascular arterial embolization is also a technique of choice which can be performed in the interventional radiology suite.

In our patient, however, the patient’s general condition, anesthetic risk and the infiltrative and hypervascularized nature of the tumor made surgery impossible. Percutaneous arterial embolization was also disregarded because of an ipsilateral common carotid artery stenosis which made access to the artery responsible for the bleeding impossible.
Figure 1. a: CT-scan in the axial plane at the level of radio-induced sarcoma located on the right horizontal branch of the mandible shows the vascular nidus arising from the right external carotid artery (arrow); b: CT-scan in the sagittal plane at the level of the right horizontal branch of the mandible shows heterogeneous mass with blurred outlines and a vascular nidus arising from the right external carotid artery (arrow).

Figure 2. CT-scan in the coronal plane obtained during the arterial phase of injection with 5 mm MIP reconstruction passing through the right common carotid artery shows tight (>80%) stenosis of right carotid artery (arrow).

Figure 3. Per-procedure control CT image during the first cryotherapy cycle shows Ice Seed® needle correctly positioned in the vascular nidus of the tumor with ice formation (arrow).

Figure 4. Repeat CT in the axial plane two months after the procedure shows loco-regional tumor growth in the right ascending branch of the mandible.

Local care was insufficient because of the clinical consequences of the chronic bleeding.

Cryotherapy consists in the application of extremely low temperature focused on target tumor tissues in order to achieve a cytotoxic effect. The effect on tissues mostly occurs when target temperature reaches −40 to −20 °C by intracellular ice formation. Osmotic changes during the ‘‘freezing-thawing-freezing’’ cycle lead to rupture of the cell walls and further apoptosis. Cryotherapy is mostly used for therapeutic or palliative analgesic purposes.

A literature search disclosed two cases in which cryotherapy has been used to treat a maxillo-facial hemangioma complicated by repeated bleeding [4,5]. In these two cases, the treatment of the venous malformations was successful with no reported postoperative complications and stopped the bleeding due to venous malformations.

In our patient, the benefits of cryotherapy were that it was minimally invasive, relatively painless and carried little
In addition, the ice is visible on repeat CT controls, thus allowing a limited size of frozen ice region located in the area being treated and preserving important structures (skin, vessels and nerves) and reducing side effects, particularly post-procedure inflammation.

In conclusion, we have reported the first use of cryotherapy as a treatment option for recurrent tumor bleeding. This treatment appears to be effective, with a low complication rate. Our observation suggests that it should be considered as an alternate option to surgery and percutaneous arterial embolization in highly selected patients.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References


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