Sacrum colon-rectal cancer metastasis: microwave ablation for palliative pain treatment

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Riassunto. Local treatment of bone metastasis (BM) remains controversial in colon-rectum carcinoma for pain control. A patient developed a sacrum BM 4 years after a left colectomy for an adenocarcinoma. Metastasis was treated in one session of CT-guided microwave ablation showing good pain control immediately after and on follow-up at four months.

Key words. Colon cancer, interventional radiology, pain, palliative care, spine metastasis.

Introduction

The axial skeleton is the most common site of bone metastases (BM) due to the highly vascularized anatomy. BM are burdened by a considerable morbidity, complex demands on health care resources and are the most common cause of cancer-related pain1. The pathophysiologic mechanism of this pain is poorly understood but probably include tumor-induced osteolysis, direct infiltration of nerves and local tissues production of prostaglandins2.

Most common bone metastasis derive from breast, prostate, lung and kidney tumors, while other primary tumors, such as colon-rectal cancer (CRC), are less frequently accompanied by BM. Local treatment of metastases such as metastasectomy or radiotherapy remains controversial in the treatment of metastatic CRC3.

Thermal ablation is an emerging technique and promising therapeutic regimen because of the short procedure time, minimally invasive nature, and ability to control pain4-5. Radiofrequency ablation (RFA) was introduced in late 80’s and is a well-established technique in the treatment of several malignancies; microwave ablation (MWA) was introduced in the clinical practice at the beginning of this century, for these reason there are less evidence on it, but the studies available prospect similar if not better results.

We would like to report our experience with a patient who developed a painful sacrum metastasis 5 years after a left colectomy. The patient underwent a CT guided MWA of the metastasis with a satisfying pain control.

Case Description

Medical history

A 47-year old Caucasian male underwent five years before a left colectomy for a mucinous adenocarcinoma (T4) accompanied by carcinosis (M1) but no loco-regional node metastasis (N0); during the procedure patient underwent hyperthermic intraperitoneal chemotherapy (HIPEC) due to carcinosis6. Patient began chemotherapy using 5-fluorouracil and leucovorin (FOLFOX) and follow-up.

Presentation

After four years of follow-up patient began complaining back pain. A contrast enhanced CT revealed the presence of a $45 \times 35 \times 25$ mm osteolytic metastasis involving the sacrum, from S3 to S5, localized near and involving partially the right neural foramen (figure 1a).
Patient underwent radiotherapy obtaining the stability of the lymphonodal lesions but not of the sacrum one. An $^{18}$FDG PET-CT performed 4 months later confirmed the metabolic activity of the lesion (figure 1b).

The pain increased worsening patient quality of life who started analgesic drug assumption.

In the following year the patient progressively lost the ability of walking due to the increasing pain, which was present even at rest and showed poor pain drug control even using morphine and NSAIDs. Due to the progression of pain, another CT scan was performed 5 years after the nephrectomy confirming the lesion progression (figure 2).

Because radiotherapy was no more applicable due to radiation exposure limits, the multidisciplinary oncologic group decided to propose to the patient a palliative treatment using MWA.

**TREATMENT AND FOLLOW-UP**

Under CT guidance and general anaesthesia, an 18 G x 150 mm introducer needle was positioned between the lesion and the rectum, near the anastomosis, to inject 40 ml of 5% glucose solution to outdistance the rectum (figure 3a and b).

Then, a 16-gauge x 150 mm minichoked, water-cooled interstitial antenna (HS Amica, HS Hospital Service S.p.A., Aprilia, Italy) was inserted in the middle of the sacrum lesion. With the use of a 2.45-GHz generator, a power of 60 W was applied for 5 minutes (figure 3c).

Patient was discharged two days after the procedure. After the anaesthesia, patient complained pain at the site of MWA, without any improvement of the pain respectively to the pre-procedure one. Since the following day, the pain improved progressively, and in one month almost disappeared. No complication was encountered.

At 4 months, the back pain is absent and the patient stopped the assumption of analgesic drugs.

**PATIENT’S POINT OF VIEW**

“It has been more than a year since I’ve begun to experience severe fits of unbearable pain in the sacroiliac area, pain so excruciating that it makes it almost impossible to breathe.

The cancer is back, after many years in remission, this time attacking my coccyx and not only that...

I began undergoing 2 cycles of chemotherapy, which helped to alleviate the pain, but only tempo-
rarily. Similarly, the radiation therapy produced positive results as well, but again only for a brief period of time.

The pain became so intense that it prohibited me from living, making it impossible for me to carry out even the most basic daily functions like putting on my shoes and tying up the laces.

These were truly difficult days when I was only able to cope for an hour or so, basically for as long as the effect of the painkillers lasted.

All of this until about a month ago, when my oncologist, who has been treating me throughout this Calvary, spoke to me about thermo-ablation, a procedure, she explained, that would tackle the problem of my pain, almost completely eliminating it.

At this point, I would have done almost anything not to have to endure the intense pain that was destroying me. For this reason, I didn’t hesitate to go along. I decided to undergo the procedure my oncologist had suggested.

The procedure, known as thermo-ablation, consists of positioning a needle in the affected bone (in my case the sacroiliac bone), connecting it to an electrical current; causing the electrical energy to be converted into calories increasing the temperature to a high enough degree that it would destroy the affected tissue.

I must admit that I was apprehensive about the procedure, because I knew that even if the results were to be positive, I wouldn’t be able to know them right away.

The desire to return to a relatively tolerable existence, however, was stronger than any concern that I may have felt.

When I came out of the anaesthetic and still semi-conscious, I wasn’t really aware of what they had done to me, but after about an hour, when the effects of the anaesthetic started to wear off, I began to feel the first post-operative pains. I was in the recovery room of the oncology department for two days after the surgery, carefully monitored by a team of nurses and doctors. The pain was still so intense that I was unable to walk, but I was administered painkillers intravenously in order to manage it. As the hours and days passed and I was released from the hospital, the pain continued to diminish with the help of the painkillers.

A month after the surgery, I can honestly say that I feel truly reborn. This procedure, in my case, has been nothing short of miraculous. The pain has disappeared and I have been able to return to my work as a bricklayer, not exactly considered light work. Even psychologically, I feel better, although I realize that the battle with cancer that I have ahead of me will be a long and difficult one.

I hope that other patients who suffer as I have, can also benefit from this procedure. From my perspective, I have been witness to a very positive experience that reflects its efficacy and worth.

I would like to express my sincerest gratitude to the entire team whose remarkable professionalism and profound humanity, guided me before, during and after the surgery, and in particular to who performed the procedure who has enabled me to return to life”.

Conclusions

Bone metastasis are frequent in advanced stages of cancer. Most common primary tumors of BM are the prostate, breast, lung, kidney, rectum, colon, and ovary. Complications from skeletal metastases include intractable pain, fracture, and decreased mobility, which may reduce patient’s quality of life. BM pain can be difficult to treat, although a number of treatment options are available, ranging from radiotherapy and chemotherapy to thermal ablation and painkillers therapy. Treatment of local disease may reduce pain in these patients, who, in most cases, have a short life expectancy. Such treatment has been shown to be fast, safe, effective and tolerable.
Thermal ablation shows promising results in several tissues and is currently included in several treatment guidelines in oncologic patients not eligible for surgery or for palliative intent for both primary and metastatic sites. Even if MWA technique developed later than radiofrequency, it shows promising results, both alone and in combination with other treatments such as radiotherapy.

The present case reports the feasibility of MWA of spine Colon-Rectal Cancer metastasis even if localized near to neural foramina. The pain control was optimal, and even if no objective pain score was collected, the quality of patient’s live significantly increased. In light of this, the resort to microwave ablation should be done earlier, immediately after the failure of radiotherapy or even before.

Thermal ablations are usually considered unsafe when applied near to sensitive structures.

The development of new technologies, such as cryo- or microwave ablation increased the risk of potential damages to nearby tissues. To solve the issue, many displacement techniques were proposed by different authors.

The most common procedure provides the injection of 5 % dextrose in water (necessary when using RF) or saline solution for other techniques.

Air and even more carbon dioxide (due to the lower risk of embolism) showed to be feasible techniques. Displacement balloons, the injection of thermoprotective gel for hydrodissection and even lever- aging the target ablation zone using the antenna itself are reported.

In our case, the dissection obtained using 5% glucose solution was enough to ensure the protection of the near rectum.

Even if no objective evidence were collected a reduction of pain and improvement in the quality of life was reported by the patient as early as a few days after the procedure and was maintained on follow-up at three months.

Future studies with extended clinical follow-up periods are needed, although these studies would be limited by the short life expectancy of these patients. However, given the promising palliative effects experienced in this case, MWA seems a feasible treatment of spine CRC BM.

Conflict of interests: the authors declare they have no competing interests.

References

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