

## Gangrene of the penis, scrotum, and perineum, occurred after radiotherapy of rectal cancer

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We present a case of a 58-year-old man hospitalized because of gangrene of the penis and scrotum, after radiochemotherapy for rectal cancer. At the time of the admission the patient presented with extensive gangrene with necrosis affecting the scrotum and the penis. During the first day of hospitalization the patient was operated. Due to the progress of the disease he had to be operated again. The status of the patient, which initially was very bad, was gradually improving. He was discharged from the hospital after 59 days in a good general state with good wound healing.

**Key Words:** rectal cancer ◊ radiation ◊ gangrene ◊ surgical treatment ◊ multidisciplinary approach

## INTRODUCTION

Radiotherapy is a widely recognized method in treating certain stages of particular oncological diseases. It can be either an independent technique or connected with chemotherapy. It is also used as a neoadjuvant and/or adjuvant therapy with surgical treatment. Rectal cancer is characterized by very low sensitivity to radiation, which is why in such cases radiotherapy is rarely applied as the only method of radical treatment. Surgical treatment is a standard procedure connected with preoperative radiotherapy or radiochemotherapy [1, 2]. In case of initially inoperable rectal cancer, radical radiochemotherapy or radiotherapy is employed in order to obtain a local tumor regression that would allow radical surgical treatment.

## CASE REPORT

Patient aged 58, was sent to our center from the Institute of Oncology with the suspicion of Fournier's

gangrene. He was treated there because of diagnosis of inoperable rectal cancer. The patient was qualified for radiochemotherapy with an option of treatment effect evaluation and a possible surgery qualification. In May 2011 radiotherapy with photons X was started to penetrate the rectal tumor and its margin. Planned dose for this area was 45 Gy. Then a boost dose was applied to the rectal tumor, giving a total planned dose of 50 Gy. Simultaneously the first chemotherapy cycle with 5-Fluorouracil and Leucovorin was administered.

After a few weeks of therapy, swelling and features of necrosis within the scrotum and the penis were noticed. The suspicion of Fournier's gangrene was propounded so antibacterial treatment with Biodacine and Metronidazole was added. Then, the patient was sent to our center. After admission to the hospital ward the patient was in a poor general condition. The patient was of asthenic build, weakened and suffering severe pain. Swelling around the pubic symphysis and extensive gangrenous changes with necrotic elements involving the scrotum, partially



**Figure 1.** Condition after radical removal of perineum necrotic tissue, area around penis, anus and inflamed testes – second surgery.



**Figure 3.** Condition of the postoperative wound on the 58th day of hospitalization.



**Figure 2.** Condition of the postoperative wound on the 30th day of hospitalization.



**Figure 4.** Control in the outpatient urology clinic.

the penis, embracing perineum and anal skin were noticed.

On the day of admission the patient underwent treatment of gangrene and removal of necrotic lesions from several wide cuts around the groin and perineum while thick tubing was being placed

The material for culture was collected and empirical antibiotic therapy of Tygacil 100 mg in 100 ml of 5% glucose and metronidazole 500 mg 2 x 1 was started, along with analgesics and irrigation. On the first day after surgery the patient was very weak with a fever reaching up to 40 degrees. He reported severe pain.

Because of low level of hemoglobin (Hgb – 8.2 g/dl), two blood units were transfused.

Over the next few days conservative treatment was applied, as well as daily dressing changes including washing the wound with hydrogen peroxide and local wound cleaning. During hospitalization the patient was still very weak. Pain around the perineum remained severe with a temporary increase in body temperature up to 38 degrees. Blood pressure remained constant at a level of 90/60 mmHg.

On the fifth day antibiotic therapy was changed. Tygacil was ablated and Biotraxon 2 x 1 g added. Despite the applied treatment, deterioration of the patient's general and local condition was observed. The swelling around the wound became bigger, necrotic lesions embraced further perineal areas and skin of the penis. After the next two days, re-surgery was administered. All of the necrotic tissues were radically cut out and the inflamed testes were removed. Because of the necessity of radical excision of the inflammatory and necrotic lesions, tissues around the perineum fell off exposing the rectal stump (Figure 1).

Due to the underlying disease – rectal cancer, patient was disqualified from hyperbaric chamber treatment because of the risk of spread of cancer.

The last stage of the surgery was to identify the stoma in the transverse colon. Because of significant blood loss during the surgery two blood units were transfused.

In the next few days, patient was in a stable condition. Conservative treatment with daily dressing changes was continued. Because of persistent pain, morphine analgesic skin patches were prescribed. On the fourth day after the surgery a light diet was added. The stoma has been working properly. After receiving wound culture result (1. *Enterococcus faecalis*, 2. *Escherichia coli*, 3. *Klebsiella pneumoniae* ESBL) targeted antibiotic therapy: Zinacef 2 x 1.5 g and Biseptol 2 x 60 mg was started. In the cultures, no anaerobic bacteria were found.

In histopathological studies of the removed tissues, tumor cells were not found. Blood culture for aerobic and anaerobic bacteria was sterile. A better general condition and gradual wound healing was achieved. Biseptol and Zinacef were gradually weaned, simultaneously adding Augmentin oral 625 mg 2 x 1 tabl. Conservative treatment with daily changing of dressing was continued.

Rehabilitation was implemented. Postoperative wound around the penis and the urethra was clean, without purulent lesions, and with a good blood supply. Pus started to gather around the rectal stump. Culture results from the rectal stump showed: 1. *Morganella morgani* SSP, 2. *Staphylococcus epider-*

*midis*. According to the antibiogram intravenous antibiotic therapy– Biseptol 2 x 480 mg and Metronidazole 500 mg 3 x 1 was added. Proper wound healing was obtained (Figure 2). On successive days patient was in a good general condition, without pain in the groin area and with a standard temperature. Intravenous antibiotics were ablated and Furagin 3 x 2 tbl, added. Due to the local severity of the disease and, thus, lack of possibility of radical treatment, a secondary suture was not used. Conservative treatment of maintaining antibiotic therapy and daily dressing change was continued. Wound healing was proper, without purulent discharge. Patient did not have fever.

On the 59th day after the first surgery the patient was discharged home in a good general condition with the order for further treatment at the Institute of Oncology and for constant control at the urology and surgical clinic (Figure 3).

After two months, the patient came to the outpatient urology clinic in order to evaluate the wound healing. The wound was healed (Figure 3).

## DISCUSSION

Radiation therapy leads to the destruction of both tumor cells and healthy tissue. Despite applying modern techniques, radiotherapy still carries the risk of serious complications. In case of preoperative rectal cancer treatment employing radiochemotherapy, the most common complications are diarrhea and skin reactions. The small intestine is most vulnerable to side effects of radiation, as it is one of the most radiation sensitive organs of the abdominal cavity. Myerson, on the basis of his observations stated that the frequency of an acute radiation reaction of the intestine in third degree increases (5%), after stand-alone therapy (up to 25%) connected with chemotherapy [3]. Level of these symptoms in some patients is sometimes so big, that they do not finish the treatment. Enteric fistula is a late complication after rectal cancer radiotherapy that might threaten patient's life. James, on the basis of his own observations states that three of 42 patients (7%) died because of this complication [4].

Pelvic radiotherapy is also connected with complications related to the urinary system. The bladder and the urethra become irritated, which leads to pollakiuria and nycturia several times during the night, with recurrent pain of the perineal area and ardor during voiding. Bruheim et al. proved in their work that in patients undergoing radiotherapy, in comparison to those who are treated only surgically, urinary incontinence appears significantly more often during the day (9% vs. 2%, p = 0.001), which

results in reduced quality of life and social functioning [5].

Irradiation is also connected with sexual dysfunction. In patients undergoing radiotherapy because of rectal cancer, decrease in libido is observed on average in 60% of these patients, erectile dysfunction in 50% and ejaculation disorder in 45%. Lew-Starowicz states that pelvic radiotherapy causes erectile dysfunction in 20–75% of patients. This is because of both, blood vessel and nerve damage [6].

Radiation gangrene is a rarely met complication after radiotherapy being applied in treating tumors located in the lower pelvis. Only a few descriptions of such cases can be found in literature.

Devitt described a case of a 67-year-old woman treated with radiotherapy because of an infiltrating recurrence of cervical cancer. As a result of radiation treatment, gangrenous cystitis was discovered. After ineffective implementation of antibiotic therapy and local treatment with intravesical infusions, the patient underwent cystectomy [7].

Another described case concerns 77-year-old man who had a gangrenous inflammation of the skin of the penis after prostate cancer radiotherapy (16 months earlier). Kohijmoto states that inflammatory change appeared on the dorsal side of the penis. Culture for aerobic and anaerobic bacteria was sterile and the biopsy showed a non-specific inflammation, without features of vasculitis and dysplasia. Although broad-spectrum intravenous antibiotics and local debridement were applied, the gangrenous change was widening. Due to the fact that the urine culture was sterile, prednisolone treatment was applied (100 mg daily). Within 24 hours after applying the therapy, fever subsided and the gangrenous changes stopped spreading. Treatment with steroids was gradually reduced. Within the next month, the penile wound healed [8].

Kanno described the case of a 76-year-old patient with radiation gangrene within the lower pelvis. After radiotherapy because of prostate cancer, gangrene of the prostate with sterile pyuria and dysuria appeared. In histopathological studies after TURP treatment, a number of necrotic tissues were found. Patient developed numerous abscesses, including perineal abscess, abscess around the penis, lung abscess, back skin abscess, lower abdomen abscess and left lower limb abscess. Despite applying steroids, regression of the changes was not obtained. It was necessary to create intestinal urine diversion [9].

In the presented case, it has to be emphasized that the primary diagnosis — Fournier's gangrene — has to be questioned. Fournier's gangrene is characterized by sudden onset, rapid progression and

absence of definitive cause. What raises our doubts is that anaerobic bacteria were not found in the cultures. Predisposing factors like diabetes, local perineal trauma, or perirectal infection were not noted in the interview. Their presence is an element that also determines the diagnosis. In the paper by Eke [10], the author stressed that there was still controversy surrounding the definition of this disease as well as a division based on its etiology. Based on the presented case report as well as on collected foreign literature we can conclude that we are dealing here with a very rare type of gangrene. Clinically it is a Fournier's gangrene, however, the fact that the main factor responsible for the appearance of the disease, in our opinion, seems to be that the patients underwent radiochemotherapy and, thus, the diagnosis of radiation gangrene appears to be justified.

## CONCLUSIONS

Although radiotherapy is widely used and highly effective, it is also related with the risk of serious complications often requiring further intensive treatment not only by the doctors specializing in radiotherapy. In case of rectal cancer radiotherapy, the most commonly met urological complications are the bladder and urethra irritation, dysuria, and sexual dysfunction.

The clinical case presented here is very rare and unusual, however, the disease that had developed following radiation therapy was life threatening, requiring a radical surgical intervention and long-term hospitalization. We made the diagnosis of radiation gangrene not to isolate a new subtype of gangrene, but to point out that this illness has a various etiology, and it can appear during treatment with radiotherapy. Especially important in our opinion seems to be the need for multidisciplinary cooperation of physicians of different specializations. In the case of pelvic tumors, particularly in men, collaboration with the oncologist–urologist should be assured. Tumors located in the pelvis have a direct or indirect influence on the urinary system and the oncological treatment sometimes carries the need of reconstructive surgery afterwards.

With the increased number of patient with diagnosed cancer, the potential amount of patients needing intervention after radiotherapy can rise. Because the probability that even such a rare pathology as radiation gangrene of the scrotum can be seen more often, patients should be informed about it, as a possible consequence of radiotherapy. That is also why, the cooperation between urologists and oncologist should improve.

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