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NEW METHOD FOR THE TREATMENT OF CAVERNOUS PROSTATE TUBERCULOSIS

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Prostate tuberculosis (PT) is not uncommon, but rarely diagnosed. Treatment of PT is a difficult task, since it is difficult to achieve an adequate concentration of antibacterial drugs in the parenchyma of even a healthy organ, and in the case of the formation of prostate caverns, their fibrous walls almost completely prevent the penetration of anti-tuberculosis drugs into the destruction focus. The method of combined surgical treatment of PT is described in detail on the example of the patient. During polychemotherapy, the cavity is opened by means of transurethral electroresection, followed by coagulation of the cavity wall by radiation of a high-energy diode laser with a wavelength of 940 nm and a power of 150 W. This approach allows to cleanse the prostate cavity from purulent-necrotic detritus and interrupt the pathological infectious and inflammatory process in its wall due to coagulation with laser radiation. The proposed method of surgical treatment of PT is both radical, since the walls of the cavities are excised and coagulated, and is minimally invasive, therefore it can be recommended for wider application.

Keywords: urogenital tuberculosis; prostate tuberculosis; surgical treatment of prostate tuberculosis.

НОВЫЙ СПОСОБ ЛЕЧЕНИЯ КАВЕРНОЗНОГО ТУБЕРКУЛЕЗА ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ

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Туберкулез предстательной железы (ТПЖ) — не редкое, но редко диагностируемое заболевание. Лечение пациентов с ТПЖ представляет трудную задачу, поскольку в паренхиме даже здорового органа трудно достичь адекватной концентрации антибактериальных препаратов, а в случае формирования каверн простаты их фиброзные стенки практически полностью препятствуют проникновению противотуберкулезных препаратов в очаг деструкции. Подробно описан метод комбинированного хирургического лечения ТПЖ на примере конкретного пациента. Способ заключается в том, что на фоне полихимиотерапии проводят вскрытие каверны посредством трансуретральной электрорезекции с последующей коагуляцией стенки каверны излучением высокоэнергетического диодного лазера с длиной волны 940 нм и мощностью 150 Вт. Такой подход позволяет очистить каверну предстательной железы от гнойно-некротического детрита и прервать патологический инфекционно-воспалительный процесс в ее стенке за счет коагуляции лазерным излучением. Предложенный способ хирургического лечения ТПЖ одновременно радикальный, поскольку иссекаются и коагулируются стенки каверн, и малоинвазивный, поэтому может быть рекомендован к более широкому применению.

Ключевые слова: урогенитальный туберкулез; туберкулез простаты; хирургическое лечение туберкулеза простаты.

INTRODUCTION

Tuberculosis of the genitourinary system is an infectious and inflammatory disease that is one of the most difficult diseases to diagnose and treat [1]. At autopsy, prostate tuberculosis (PT) is detected in 77% of men who have died of tuberculosis of any localization [2], despite the fact that this disease was not diagnosed *in vivo*. PT greatly impairs the quality of life of the patient, leads to infertility, and can be sexually transmitted [3]. The caverns of the prostate gland never close, maintaining a life-long high premorbid background.

The treatment of PT patients is difficult, since it is difficult to achieve a sufficient concentration of antibacterial drugs in the parenchyma of even a healthy organ. In the case of prostate cavern formation, the fibrous walls almost completely prevent the penetration of antituberculosis drugs into the destruction focus.

PT patients can be treated with rectal suppositories and therapeutic microclusters [2, 4]. These methods enable to increase the concentration of antituberculosis drugs focusing the tuberculous inflammation in the prostate gland but only at the stage of infiltrative tuberculosis, prior to cavern formation. Moreover, a known method of treatment with instillations of autologous blood [5] is also available, which is aimed at stimulating local immunity, but it is also effective only in the initial stage of the disease.

Impairment of the outflow of caseosis and purulent-necrotic detritus from the caverns of the prostate gland contribute to abscess formation, which can have fatal implications for the patient. Even in the case of a relatively favorable course of the disease, where caseosis within the cavern of the prostate gland is absorbed by calcium salts, there is a risk of malignancy due to chronic inflammation and constant irritation of the prostate tissue due to calcified caseosis [6].

Fig. 1. Caverns of the prostate
Рис. 1. Каверны предстательной железы

CLINICAL CASE

Patient V., a 48-year-old crane operator, had bad habits including smoking about one pack a day for more than 30 years and frequently drinking alcoholic beverages. He had a history of trichomoniasis and chlamydia. Over the last 12 years, he was monitored by a urologist for chronic prostatitis complicated by erectile dysfunction. He received antibacterial therapy several times as well as pathogenetic treatment with incomplete and short-term effects. Fluorography was performed every 2 years, and pulmonary tuberculosis was not detected. Considering the long course of the disease and the ineffectiveness of conventional treatment, he was referred to the urological clinic of the Novosibirsk Research Institute of Tuberculosis of the Ministry of Health of Russia in order to rule out PT.

Upon admission, he complained of constant dull pain in the perineum (9 points of pain intensity on a 10-point visual analog scale), sometimes irradiating to the testicles, frequent urination (up to 18 times during the day and up to 4 times at night) with gripes, lack of erection, decreased libido, poor general health, atony, and asthenia.

The examination revealed normal constitution and satisfactory nutrition of the patient. Furthermore, pathology was not palpable in the scrotal organs. Also, digital rectal examination revealed free ampulla. The prostate was enlarged, tuberous, dense, and moderately painful; the groove was smoothed. In addition, body temperature was normal. In the general analysis of blood, there was leukocytosis of 8.6×10^6, ESR was 47 mm/hour, and other indicators were within the normal limits. Three-glass urine test showed 17–20 leukocytes in the field of view in the first portion, 5–7 leukocytes in the second portion, and up to 40 leukocytes in the third portion. In the prostatic fluid obtained by massage, there were 80–100 leukocytes and 2.7 million in 1 ml in the ejaculate obtained by masturbation. In contrast, retrograde urethrography showed leaks into the prostate gland caverns (Fig. 1).

Ultrasound examination of the kidneys revealed no pathological changes. Moreover, transrectal ultrasound examination of the prostate gland showed that the volume of the gland increased to 54 ml, echo structure was heterogeneous, and several caverns with a diameter of up to 3 cm were determined. In addition, videofiber urethroscopy revealed the edematous seminal hillock and several abscesses (Fig. 2).

The GeneXpert approach identified *Mycobacterium tuberculosis* (MBT) in the ejaculate. In addition, the Mantoux test result with 2 TE was hyperergic.

Cavernous tuberculosis of the prostate gland, MBT+, was diagnosed. Standard antituberculosis polychemotherapy was prescribed, which improved the general condition marginally after 1 month, but no dynamics were revealed by radiological examination of the prostate gland, which was nevertheless expected. Furthermore, pyospermia, pain, and dysuria persisted as before.

The patient used a new method of treating cavernous tuberculosis of the prostate [7] by performing standard antituberculosis polychemotherapy, which differs from the existing methods in that, during polychemotherapy, the cavern is opened by means of transurethral electroresection, followed by coagulation of the cavernous wall with radiation from a high-energy laser diode with a wavelength of 940 nm and power of 150 W. This approach helps to clear the cavern of the prostate from purulent-necrotic detritus and interrupt the pathological infectious and inflammatory process in its wall due to coagulation with laser radiation.

Preparation for the surgery was standard. After premedication, the patient was placed on the operating table with legs elevated and bent at the knees that were fixed to special stands (typical position of the patient for performing transurethral electroresection). A resectoscope was inserted under aseptic conditions and general anesthesia; the most protruding areas of the prostate gland and foci of purulent inflammation were visually selected and opened with an electric knife. Through the irrigation system of the resectoscope, the caverns were washed with a disinfectant solution, after which the cavern walls were coagulated with radiation from a high-energy laser diode with a wavelength of 940 nm and a power of 150 W. During the postoperative period, continuous irrigation with an antiseptic solution was carried out for 2 days, after which the urethral catheter was removed and spontaneous urination was restored.

After 3 months, a control study revealed that the pain intensity decreased from 9 to 3 points and the frequency of urination decreased to 7–9 during the day and 0–1 at night. The patient was unable to collect the ejaculate, and 15–18 leukocytes in the field of view were found in the prostatic fluid. Moreover, MBT has not been identified in the prostatic fluid.

During the control examination after 6 months, the patient had no complaints and no pain. The urination was free and painless. There were 10–12 leukocytes in the prostatic fluid in the field of view, and MBT was not identified. Also, urine and blood tests were within normal limits. Furthermore, ultrasound examination of the prostate gland indicated a decrease in the prostate volume of up to 24 ml, and there were foci of hyperechogenicity, without caverns.

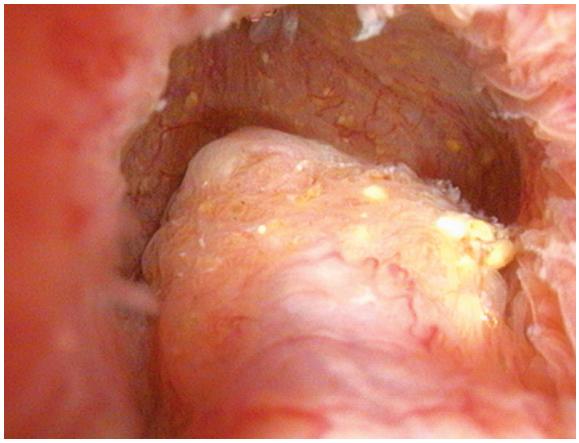

Fig. 2. Ureteroscopy of a patient with prostate tuberculosis (photo by N.V. Fedorenko)
Рис. 2. Уретроскопия пациента с туберкулезом простаты (фото Н.В. Федоренко)

Thus, the new approach to the surgical treatment of PT patients is accompanied by minimal blood loss and short rehabilitation period (in the postoperative period, free painless urination was restored on day 37). This approach was used to sanitize the prostate gland caverns, which could not be carried out by conservative methods. Also, the cessation of bacterial excretion could be achieved. Furthermore, control ultrasound examination did not show the prostate gland caverns.

DISCUSSION

Pulmonary tuberculosis is the most common type of the disease; about 20%–25% of cases are extrapulmonary and up to 27% of them are tuberculosis of the genitourinary system [8, 9]. In the incidence structure of extrapulmonary forms, urogenital tuberculosis (UGT) ranks second [10, 11]. Some authors attribute up to 40% of all cases of extrapulmonary tuberculosis to UGT, the second most prevalent localization in developing countries and third in developed countries [12–15].

PT was first described in 1882 by A. Benchekroun et al. [16]. How often is the prostate infected with tuberculosis? According to official statistics, the proportion of isolated prostate lesions is relatively small, and intravital PT is seldom diagnosed [16, 17]. N. Gupta et al. noted that PT is diagnosed primarily after transurethral resection by pathomorphological examination of the surgical material [18]. At the same time, according to autopsy data, PT occurs in 77% of patients who died from tuberculosis of any localization [2]. A. Sporer and

O. Auerbach [19] reported 728 autopsies of tuberculosis patients and 100 of them revealed prostate lesions. Moreover, S.A. Merchant [20] noted that the prostate gland was affected in all cases of genital tuberculosis studied by him.

PT is capable of mimicking prostate cancer and benign prostatic hyperplasia; therefore, high alertness is required [21]. In a 60-year-old patient, a case of PT under the guise of prostate cancer was recorded [22]. Cases of PT complicated by abscess in young patients with HIV have also been reported [9, 23].

PT occurs as a result of hematogenous dissemination [8, 23, 24], and the sexual transmission route has also been described [3]. Chronic granulomatous inflammation occurs with the subsequent destruction of the parenchyma and formation of caseosis. Caverns of the prostate never heal, maintaining a high premorbid background and risk of reactivation. Post-tuberculous scar is a prerequisite for the development of a malignant tumor [6].

Tuberculous prostatitis accidentally diagnosed using biopsy or transurethral resection should be treated with a full course of combination chemotherapy for at least 6 months [18, 25]. With the highest inoculation conversion rates and the lowest relapse rates, 6–9-month regimens containing rifampicin and pyrazinamide are very effective [18]. While it is not possible to heal the prostate gland caverns with medication, some authors recommend using conservative therapy only [26]. Approaches have not been developed for the surgical treatment of PT patients; hypothetically, transurethral resection is considered expedient [27], but there are no records of the use of this surgery in prostate tuberculosis [18]. Prostate abscesses that do not resolve with drug therapy can be transrectally aspirated under ultrasound examination control [25].

CONCLUSION

PT is a rarely and accidentally diagnosed disease. However, this type of extrapulmonary tuberculosis should always be taken into account for chronic prostatitis resistant to standard therapy. PT and prostate cancer are mutually disguised; therefore, appropriate alertness is required in both fields. The neglected forms of PT are not curable with medication; and considering the contagious nature of tuberculosis, surgical aids should be used more widely in the treatment of this category of patients. Since the walls of the caverns are excised and coagulated, the proposed method of surgical treatment of PT is both radical and minimally invasive and can therefore be recommended for wider use.

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