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Case Report

CASE REPORT

Neovaginoplasty for radiation-induced vaginal stenosis using Nile Tilapia Fish Skin as a biological graft

Maria Tereza Pinto Medeiros Dias[1], Andreisa Paiva Monteiro Bilhar[1], Livia Cunha Rios[1], Bruno Almeida Costa[2,*], Úlima Rates Duete[1], Edmar Maciel Lima Júnior[3], Ana Paula Negreiros Nunes Alves[4], Zenilda Vieira Bruno[1], Manoel Odorico de Moraes Filho[2], and Leonardo Robson Pinheiro Sobreira Bezerra[1]

[1]Maternity School Assis Chateaubriand (MEAC), Federal University of Ceará (UFC), Fortaleza, Ceará, Brazil, [2]Drug Research and Development Center, Federal University of Ceará (UFC), Fortaleza, Ceará, Brazil, [3]Burn Treatment Center, Dr. José Frota Institute, Fortaleza, Ceará, Brazil, and [4]Nursing, Dentistry and Pharmacy School, Federal University of Ceará (UFC), Fortaleza, Ceará, Brazil

*Correspondence address. Clinical Pharmacology Unit, Drug Research and Development Center, Federal University of Ceará (UFC), Rua Cel. Nunes de Melo 1000 - Rodolfo Teófilo, Fortaleza, Ceará 60430-275, Brazil. Tel: +55-85-33668033, +55-85-33668346, +55-85-999626674; Fax: +55-85-32232903; E-mail: bruno_almeida_costa@hotmail.com

Abstract

Tilapia skin showed good results when used as a biological graft for surgical management of Mayer–Rokitansky–Küster–Hauser syndrome. Thus, our researchers considered the use of this biomaterial for neovaginoplasty in radiation-induced vaginal stenosis. We report the case of a 41-year-old female patient with a total occlusion of the vaginal canal after radiotherapy for vaginal cancer. McIndoe neovaginoplasty using tilapia skin as a scaffold for proliferation of new vaginal epithelium was performed. Initially, laparoscopic dissection of the rectovaginal septum and vesicovaginal space spaces was conducted. In the vaginal surgical time, a transverse transmural incision was made in the scarred vaginal reminiscent followed by blunt dissection and insertion of an acrylic mold covered with tilapia skin. Good anatomical and functional outcomes were noted. Vaginal reconstruction with tilapia skin seems to be an excellent option for patients with radiation-induced vaginal stenosis due to its wide availability, easy application and high effectiveness.

INTRODUCTION

Primary cancer of the vagina comprises approximately 3% of all malignant neoplasms of the female genital tract with an incidence of 1 per 100 000 women [1]. Management frequently involves brachytherapy and external beam radiation therapy [2]. Radiation leads to epithelial injury, decreased blood supply, hypoxia and telangiectasias, resulting in atrophy of vaginal mucosa, absent lubrication, loss of vaginal elasticity, formation of adherences and fibrosis [3]. Severe vaginal stenosis (VS) may result, leading to sexual dysfunction and inability to perform adequate pelvic examination. Regular sexual intercourse or the use of vaginal dilators can prevent VS, but these conservative treatments may not be enough to maintain vaginal patency. Surgical treatment of the disorder is technically challenging, and there is no consensus on the ideal technique [4].

Nile Tilapia Fish Skin (NTFS) has non-infectious microbiota, morphological structure comparable to human skin, high in vivo bioresorption and wound healing activity in burns [5, 6]. When

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used as a biological graft for surgical management of Mayer–Rokitansky–Küster–Hauser syndrome (MRKHS), it led to good results [7]. Thus, our researchers considered the use of NTFS for neovaginoplasty in radiation-induced VS.

CASE REPORT

We report the case of a 41-year-old female patient diagnosed with vaginal cancer after postcoital bleeding in 2009. After complete tumor resection surgery, pathological analysis revealed a poorly differentiated squamous cell carcinoma with the involvement of the vaginal lamina propria. EBRT was subsequently performed, followed by brachytherapy. She was discharged, in 2013, from oncological monitoring. However, at this period, she developed progressive occlusion and dryness of the vaginal canal, accompanied by amenorrhea, pelvic pain and weak urinary stream.

Physical exam revealed a total vaginal occlusion and presence of fibrotic tissue at the introit. Contrasted pelvic magnetic resonance imaging revealed the loss of uterine volume and narrowing of the vaginal canal. At first, she tried daily use of a vaginal mold in association with topic estriol with no success. We then proposed neovaginoplasty with the McIndoe technique using NTFS as a scaffold for proliferation of new vaginal epithelium. After the local institutional review board's approval and written permission from the patient were obtained, the surgery was performed. The process of preparing and sterilizing NTFS for application was described in our previous case reports.

A video presentation of the procedure's steps and results is available as Supplementary Material. Before surgery, a sterile acrylic mold suitable for the procedure and with fixing holes is required. Glycerolized NTFS is washed with 0.9% saline to remove excess glycerol and then is attached to the mold with separate stitches of multifilament polyglactin 3.0.

The procedure was started with videolaparoscopy. Marked fibrosis and tissue retraction were present in the rectovaginal septum and vesicovaginal space. Careful laparoscopic dissection of those spaces was performed with dissecting scissors and bipolar energy. Following separation of the rectum and bladder from the remaining vaginal tissue, the vaginal surgical time was started. A transverse transmural incision was made by vaginal route in the scarred vaginal reminiscent. Subsequently, blunt dissection was performed, initially with digital separation of tissues then with the aid of a vaginal speculum. This allowed lysis of fibrotic tissue and lateral expansion of the newly created cavity, which was capable of easily accommodating the length of two fingers. At the same time, via videolaparoscopy, additional space was being created in the pelvis with dissection performed laterally and superiorly between the vaginal apex and pelvic peritoneum. Previous insertion of the speculum led to bulging of pelvic connective tissue, facilitating the location of the vaginal apex.

The neovagina created measured 10 cm by 3 cm. Subsequently, the vaginal mold covered with two pieces of tilapia skin was accommodated into the newly created cavity. The white internal side of NTFS stayed in contact with the walls of the neocavity. The mold was held in position by four sutures made with multifilament polyglactin 1.0 sutures in the labia majora. Cystourethroscopy was performed and demonstrated in the normal bladder and urethra, with no injuries noted. Rectal examination was also normal. There were no surgical complications.

The patient remained on bed rest for 9 days, after which the sutures and the mold were removed. At this point, NTFS had been partially reabsorbed. A larger plastic mold was then inserted, and the patient was advised to wear it day and night for 12 weeks and then nightly until sexual activity could be initiated. Sixty days after the procedure, the patient had excellent vaginal caliber with a width greater than two fingers and depth of 7 cm. No vaginal strictures or granulation tissue was noted. Also, at that time, she developed vaginal intercourse with complete vaginal penetration and reported satisfactory desire, lubrication and orgasm.

DISCUSSION

In VS, the creation of a neovagina using split skin grafts, fasciocutaneous flaps and amnion grafts [8, 9] has been reported, but there is only a small experience. Also, considerable surgical time, major risk of infections, hair growth and development of abdominal or inguinal scars are major drawbacks with the autologous grafts [10], further disclosing the need for new procedures using different materials.

The patient here reported constitutes the first case of radiation-induced VS in which this technique was used successfully. Good anatomical and functional results were obtained with the use of NTFS, and no side effects were reported, suggesting efficacy of the procedure.

When used in neovaginoplasty, NTFS acts as a true scaffold, allowing scar tissue to undergo metaplasia and epithelization. We hypothesize that cells in the dissected space between the rectum and bladder have pluripotent potential for tissue differentiation. This is further suggested by our previous study with NTFS, in which neovaginal mucosa of a patient with MRKHS exhibited stratified squamous epithelium, matching normal adult vagina as far as histologic appearance is concerned [7].

Vaginal reconstruction with NTFS seems to be an excellent option for patients with radiation-induced VS due to its wide availability, low cost, easy application and high effectiveness. However, we still believe it is imperative the patient perform vaginal dilation after surgery and maintain close postoperative follow-up. Limitations include the experimental nature of this study, based on a single case report with no long-term outcome results.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *JSCREP* online.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest and nothing to disclose.

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