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Is it mandatory to apply dressing on the exit site of the Tenckhoff catheter?

ABSTRACT

To prevent infectious complications in peritoneal dialysis, procedures of caring for peritoneal catheters must be followed. As per standard practice, the exit site of the peritoneal catheter should be secured with an appropriately made dressing. However, it appears that it is acceptable to keep the peritoneal catheter

without a dressing in some special situations. The following study presents cases of patients successfully managed in this way without infectious complications.

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Key words: peritoneal dialysis, Tenckhoff catheter, infectious complications, prevention

INTRODUCTION

Peritoneal dialysis is a renal replacement therapy modality making use of the semipermeable nature of the peritoneal membrane. This technique requires a catheter, most frequently a Tenckhoff catheter, being placed within the peritoneal cavity and permanently retained in the abdominal integument [1]. The exit site of the catheter and its tunnel are susceptible to bacterial infections potentially leading to peritonitis. Infectious complications in this group of patients are the most common cause of conversion to hemodialysis. Proper catheter management is aimed at preventing infection and ensuring long-term, correct catheter functioning.

INTERNATIONAL GUIDELINES AND EXPERIENCE IN THE MANAGEMENT OF TENCKHOFF CATHETER EXIT SITES

In routine care, the International Society for Peritoneal Dialysis (ISPD) recommends cleansing the exit site of the catheter at least twice a week, after every shower bath or accidental soaking, along with the application of topical antimicrobial agents to the exit site. Mupirocin is recommended for the prevention of infections caused by *Staphylococcus aureus* (the most common etiological factor responsible for the exit site or tunnel infec-

tions) while gentamycin is recommended for the prevention of infections caused by *Pseudomonas* species. Catheter exit site cleansing is usually performed using a 10% solution of povidone-iodine (iodopovidone), chlorhexidine (0.05 to 2% solution), aseptic soap, physiological saline, or sodium hypochlorite solution (3–10%) [2]. Iodopovidone and chlorhexidine were shown to reduce the incidence of local infections as compared to soap and water. Hydrogen peroxide should not be used as it tends to cause skin drying and may be toxic to normal granulation tissue. Scabs, if any, should not be removed when cleaning the catheter exit site [3]. After cleansing, the exit should be dried with a clean towel that had not been used on other parts of the body. Catheter immobilization is usually recommended to prevent injuries at the exit area. It is also important to inform patients about the need to be careful and avoid other mechanical injuries, for example, those caused by tight clothing, leaning the abdomen against surfaces or by carried objects.

At most sites, dressings are recommended, and they should be changed using an antiseptic procedure usually every two days. As demonstrated by Mushahar et al., regular application of dressings may not be necessary [4]. The study showed that the dressing-free approach involving the use of topical mupirocin cream is effective in preventing infections associated with peritoneal dialysis catheters. In

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addition, the approach is more cost-effective, patient-friendly, and reduces the quantities of disposable items used.

POLISH GUIDELINES AND EXPERIENCE IN THE MANAGEMENT OF TENCKHOFF CATHETER EXIT SITES

In their recommendations on the prevention and treatment of peritoneal dialysis complications, the Peritoneal Dialysis Working Group of the Polish Society of Nephrology discuss the routine procedures in place at the peritoneal dialysis centers in Poland [5]. The most common antiseptic agents include povidone-iodine solution and octenidine/phenoxethanol (Octenisept). The dressings are usually changed every 1 to 3 days and after each bath. A deviation from ISPD recommendations consists in the abandonment of local antibiotic therapy for the prevention of infections. This does not translate to an increased risk of exit and tunnel infections; the rate of these infections, as reported in Polish centers, is low [6]. Each center may consider the prophylactic use of antibiotics available in Polish conditions, namely mupirocin (Bactroban ointment or cream), ciprofloxacin (Cetraxal ear drops, Ciloxan eye drops or ointment, Cipronex 0.3% eye drops), gentamicin (Gentamicin WZF 0.3% eye drops; no cream formulation containing gentamicin alone are available in Poland). However, using these agents on unremarkable exit sites may contribute to drug resistance of potentially pathogenic strains. Nasal assessment of *Staphylococcus aureus* carrier status may be considered in patients undergoing peritoneal dialysis (swab cultures taken every six months), and mupirocin treatment may be initialized in case of a positive result. Securing the catheter exit site with a sterile dressing is the standard practice.

AUTHORS' EXPERIENCE

The 3M™ Tegaderm™ dressing, consisting of a thin, hypoallergenic film with latex-free adhesive strongly binding the skin is currently the most prevalently used dressing at the Peritoneal Dialysis Outpatient Clinic of the 1st Department of Nephrology and Transplantology with Dialysis Unit in Białystok. Omnifix® E, made of hypoallergenic non-woven fiber with synthetic rubber adhesive, and Elastopor®, a non-sterile dressing band made of hydrophobic non-woven fiber with hypoal-

lergenic acrylic adhesive, are also in use at the clinic. According to the materials provided by the 3M™ Tegaderm™ [7], the dressing consists of polyethylene film packaging, Polyethylene-cellulose silicone carrier liner, urethane polymer, silicone-coated paper liner, acrylate (precise specification subject to commercial confidentiality), and rayon backing.

The manufacturer of Omnifix® E [8] declares the product to include 100% polyester, white spunlace non-woven (the manufacturing technology consists of water needles, i.e. multiple jets of water under high pressure used to entangle the web of elementary fibers), synthetic rubber adhesive, and wave pre-cut siliconized paper.

According to the manufacturer's information, Elastopor® dressings consist of acrylic adhesive-coated non-woven fabric [9] (a more detailed composition analysis is unavailable).

Another available product is DERMA-FOIL, a sterile, transparent polyurethane dressing with a paper frame and label, coated with a hypoallergenic acrylic adhesive [10].

In some vulnerable patients, contact dermatitis is observed when dressings are applied onto the exit side of the Tenckhoff catheter. It may be caused by the response to a disinfectant agent of the dressing component. Acrylic adhesive, a frequent component of many numerous dressing patches, is a potential allergenic factor. Manufacturers prefer not to reveal the exact chemical name of the adhesive agent, which impedes allergological diagnostics and selection of a product appropriate for the patient.

As of the date of this article, a total of six patients are under the care of our unit in whom local antiseptics are used alone with no dressings applied onto the exit site of the Tenckhoff catheter. Provided below are case descriptions of three of these patients.

CASE 1

A female patient, aged 57, started receiving peritoneal dialysis in August 2017, previously on hemodialysis. The direct reason for conversion to peritoneal dialysis consisted in the lack of vascular access. Following the initiation of dialysis therapy in 2014 (hemodialysis, Permcath vascular access), no signs of local allergy to dressings applied around the permanent catheter were observed. In March 2018, 6 months after the switch to peritoneal dialysis, erythema, and dry skin developed un-

der the dressing around the Tenckhoff catheter exit. Attempts at using different materials were made, and finally, a decision to leave the catheter exit dressing-free was made in May 2018. The patient has remained free of infectious complications associated with peritoneal dialysis to the present date (Fig. 1).

CASE 2

A 68-year-old male patient has been receiving peritoneal dialysis treatment since October 2017. In January 2019, an inflammation of catheter outlet due to *Pseudomonas aeruginosa* infection was diagnosed; subsequent infections of the same etiology were observed in May and September of the same year. In each case, the infections were successfully treated. Symptoms of allergy to the dressing patch were observed starting from December 2019, and a decision was made to leave the catheter exit dressing-free. No infectious complications have been observed so far. In this case, leaving the catheter exit dressing-free seems to have reduced the risk of infection (Fig. 2).

CASE 3

A 57-year-old, obese female patient has been receiving peritoneal dialysis treatment

since January 2018. In June 2018, skin erythema with eczema and scabbing was observed near the Tenckhoff catheter exit. The catheter exit was left dressing-free. In March 2019, an inflammation of the catheter exit site and catheter tunnel developed as the result of the *Pseudomonas aeruginosa* infection. In May 2019, signs of catheter tunnel inflammation (swelling) were observed, with the patient reporting a history of trauma at the site (discomfort within the tunnel after having leaned against the washbasin in the bathroom). A similar episode occurred in November 2019, with the patient receiving treatment in an outpatient setting. The aforementioned episodes involved no leakage of contents from the catheter mouth, with swelling and inflammatory infiltration of the tunnel being the only findings and most probably due to injury. No complications have been observed in the patient from November 2019 to the present day.

DISCUSSION

Numerous compounds included in the composition of acrylic plastics may present sensitizing properties. Hypersensitivity is caused mainly by monomers, i.e. acrylic acid and methacrylic acid derivatives, oligomers,



Figure 1. A 57-year-old female patient receiving peritoneal dialysis treatment since August 2017. Erythema and dry skin under the dressing visible around the exit of the Tenckhoff catheter

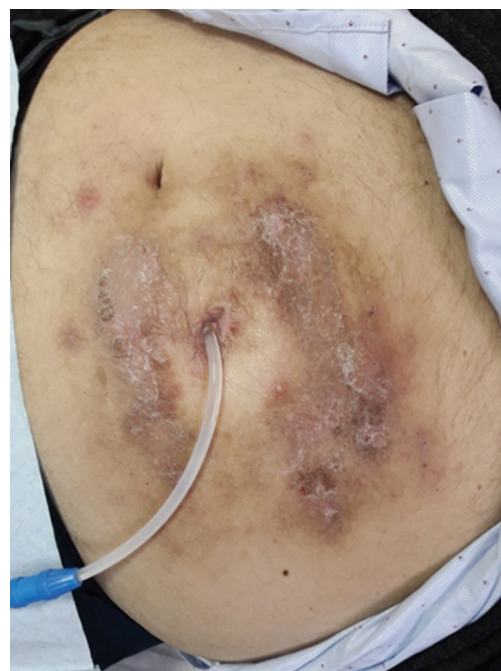


Figure 2. A 68-year-old male patient receiving peritoneal dialysis treatment since October 2017. Symptoms of sensitization to plaster patch have been observed since December 2019, in the form of extensive maculopapular skin eruptions, as well as cracks and fissures in keratinized epidermis

copolymers, as well as initiators, activators, plasticizers, and stabilizers. Allergic responses in patients are most commonly caused by the derivatives of acrylic and methacrylic acids. Acrylates may cause severe skin eczema. Along with inflammatory lesions, the clinical presentation consists of excessive keratinization, as well as cracks and fissures within the keratinized epidermis. Immediate reactions occur upon occupational or non-occupational exposure to acrylamides, especially manifesting as urticaria, conjunctivitis, nasal mucositis, and attacks of dyspnea [11, 12].

In 2010–2011, an observational study was conducted at the Medical University of Isfahan, Iran, on a group of 72 patients receiving continuous ambulatory peritoneal dialysis, including 54 patients with catheter dressing and 18 without catheter dressing [13]. Dressing-free management of the catheter exit site was associated with a lower risk of dialysis-related peritonitis and infection of the catheter exit site and catheter tunnel. Like in the previously mentioned study by Mushahar et al., the Iranian study confirms that application of dressings on the outlet of the Tenckhoff catheter does not have to be mandatory and that dressing-free management is sometimes beneficial for patients. Such a practice is sometimes forced by the clinical situation, such as

the presence of contact dermatitis. One should keep in mind that patient collaboration and compliance with catheter management principles is the most important factor in the maintenance of proper conditions at the outlet of the dialysis catheter regardless of whether dressing materials are used or not.

CONCLUSION

The management of patients receiving peritoneal dialysis without applying the dressing onto the exit site of the Tenckhoff catheter is one of the acceptable approaches provided that the patient follows basic recommendations regarding the catheter outlet care and protects it from being damaged. If symptoms of contact dermatitis and itching occur in the catheter exit region, wearing a dressing may even increase the risk of injury (scratching) and infection. Despite ISPD recommendations on applying local antibiotics permanently onto the catheter exit, this is not a standard practice in Poland. No cream formulation of gentamicin is available for outpatient use while the concentration of gentamicin in the injection and infusion fluids is too high. It appears that one should not be afraid of leaving the catheter exit site without dressing in clinically justified cases.

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