

Elaboration and implementation of a protocol for infiltration and extravasation of antineoplastics in central venous access

RESUMO | Objetivo: Relatar a experiência na elaboração e implantação do protocolo de extravasamento e infiltração de antineoplásicos em acesso venoso central. Método: estudo descritivo, tipo relato de experiência realizado de fevereiro a maio de 2021. Resultados: Após a busca de evidências na literatura, foi elaborado um fluxograma referente aos cuidados de enfermagem realizados durante e após o extravasamento/infiltração. Além das medidas iniciais padronizou-se o uso da hialuronidase tópica e da fotobiomodulação (1 a 3 joules, com potência de 100 miliwatts). A área deveria ser demarcada e se possível fotografada. Após a validação do protocolo por um grupo de enfermeiros especialistas e pelo escritório de qualidade, foi implantado em um Ambulatório de Oncologia de Hospital Público do interior do Estado de São Paulo. Conclusão: Apesar de raro, o extravasamento em acesso central pode acontecer e a equipe precisa de um protocolo assistencial para padronizar a conduta e garantir o sucesso da terapêutica.

Descritores: Terapia com luz de baixa intensidade; Lasers; Extravasamento de materiais terapêuticos e diagnósticos; Antineoplásicos.

ABSTRACT | Objective: To report the experience in the elaboration and implementation of the protocol for extravasation and infiltration of anticancer drugs in central venous access. Method: descriptive study, experience report type carried out from February to May 2021. Results: After searching for evidence in the literature, a flowchart was created referring to the nursing care performed during and after the extravasation/infiltration. In addition to the initial measurements, the use of topical hyaluronidase and photobiomodulation (1 to 3 joules, with a potency of 100 milliwatts) was standardized. The area should be demarcated and, if possible, photographed. After validation of the protocol by a group of specialist nurses and by the quality office, it was implemented in an Oncology Outpatient Clinic of a Public Hospital in the interior of the State of São Paulo. Conclusion: Although rare, extravasation in central access can happen and the team needs a care protocol to standardize the conduct and ensure the success of the therapy.

Keywords: Low-intensity light therapy; lasers; Extravasation of therapeutic and diagnostic materials; Antineoplastics.

RESUMEN | Objetivo: Informar la experiencia en la elaboración e implementación del protocolo de extravasación e infiltración de fármacos antineoplásicos en acceso venoso central. Método: estudio descriptivo, tipo relato de experiencia realizado de febrero a mayo de 2021. Resultados: Después de la búsqueda de evidencias en la literatura, se elaboró un diagrama de flujo sobre los cuidados de enfermería realizados durante y después de la extravasación/infiltración. Además de las mediciones iniciales, se estandarizó el uso de hialuronidasa tópica y fotobiomodulación (1 a 3 julios, con una potencia de 100 milivatios). El área debe ser delimitada y, si es posible, fotografiada. Después de la validación del protocolo por un grupo de enfermeros especialistas y por la oficina de calidad, fue implantado en un Ambulatorio de Oncología de un Hospital Público del interior del Estado de São Paulo. Conclusión: aunque rara, la extravasación en el acceso central puede ocurrir y el equipo necesita un protocolo de atención para estandarizar la conducta y garantizar el éxito de la terapia.

Palabras claves: Terapia de luz de baja intensidad; láseres; Extravasación de materiales terapéuticos y de diagnóstico; Antineoplásicos.

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INTRODUCTION

The administration of intravenous chemotherapy is the main anti-cancer treatment modality, with approximately 1 million infusions per day worldwide, and raises several concerns for both patients and healthcare teams, the main one being patient safety during care.¹

In view of this, the World Health Organization (WHO) established in 2004 the World Alliance for Patient Safety with the purpose of defining and identifying, worldwide, priorities in the area of patient safety. Adverse events (AE) were defined as unintentional damage resulting from care and that are not related to the natural evolution of the disease, but to the treatment.²

Extravasation is considered an important AE, being defined as the escape of vesicant drugs out of the blood vessel. Infiltration addresses non-vesicant and irritating drugs. Irritating drugs can cause reactions such as burning, phlebitis or pain even when properly infused and rarely cause necrosis or ulceration even when extravasated in large amounts. On the other hand, vesicants when extravasated cause great damage to the underlying tissue, causing pain and quickly leading to necrosis. Unlike the drugs mentioned above, non-vesicant drugs do not cause any tissue damage when extravasated.^{3,4,5}

Extravasation is a feared and serious complication that can directly impact the patient's quality of life. DNA-binding vesicant drugs, such as doxorubicin, can remain in the tissue for up to 28 days and increase the lesion by 5 centimeters from the incident site, leading to a progressive, uncontrolled necrosis, causing pain and

discomfort.^{4,5,6}

The indication of central venous access (CVA) will depend on the type of protocol used and on pre-existing venous conditions. However, a stroke can decrease the risk of extravasation, but not prevent it, with an incidence of extravasation being around 0.26% to 4.7%.⁷

The choice of stroke should be centered on the characteristics of the patient, as well as the type and duration of therapy. In oncology, the most commonly used strokes are the Peripherally Inserted Central Catheter (PICC) and the Totally Implantable Catheter (TIC) also known as port-a-cath®.⁸ However, ICUs are more cost-effective when compared to other catheters in terms of reducing complications and patient autonomy.⁹

Interventions should be performed immediately upon suspicion of infiltration/extravasation. This requires the use of evidence-based protocols.⁸ Protocols are systematically structured recommendations to guide healthcare professionals' decisions regarding specific care in certain circumstances.¹⁰

The objective of this work was to report the experience in the elaboration and implementation of an antineoplastic extravasation protocol in stroke.

METHOD

This is a descriptive study, of the experience report type, carried out at the Oncology Outpatient Clinic of the Botucatu State Hospital, linked to the Hospital das Clínicas of the Faculty of Medicine of Botucatu. Public, secondary, university and teaching hospital in the interior of the State of São Paulo.

The Oncology Outpatient Clinic is considered a reference for care by the Ministry of Health as a High Complexity Unit in Oncology (UNACON). It has clinical oncology, hematology and pediatric oncology services, performing an average of 1700 consultations/month and 1500 chemotherapy sessions/month.

The development of the protocol for

extravasation/infiltration of antineoplastic agents in stroke was carried out by a group of nurses from the Oncology Outpatient Clinic and began in February 2021 through a literature search and was implemented in May of the same year.

RESULTS

The nursing team already had a well-established protocol for extravasation in peripheral venous access, where they used hyaluronidase and photobiomodulation therapy as potential antidotes. However, there were no guidelines on how to proceed in case of extravasation and/or infiltration of antineoplastic agents that occurred in stroke.

After searching the literature, a flowchart was created (Figure 1) referring to the nursing care performed during and after the extravasation and infiltration of chemotherapeutic agents in stroke.

Some nursing care was established that guided care, such as: stopping the chemotherapy infusion, not removing the access device, aspiration of the drug present at the site and observing the presence of erythema, induration and/or local pain complaint.

After finding the adverse event, immediately notify the physician for evaluation and request for imaging tests (chest radiography or tomography), to be able to determine the location of the antineoplastic (pleura, mediastinum, subcutaneous) and the amount of extravasated or infiltrated fluid.

During the medical evaluation of the imaging tests, the conduct should be performed depending on the location of the antineoplastic. If it involves the pleura or mediastinum, invasive measures may be performed, such as thoracentesis, thoracoscopy, and thoracotomy. If limited to the subcutaneous tissue, a possible drainage of the liquid should be considered and topical measures should be initiated, such as: photobiomodulation using red laser (100 mW) of 1 to 3 joules, application of a thermal compress (cold or warm)

and topical application of hyaluronidase.

A concern of the nursing team that developed the protocol was to keep the patient's follow-up to assess the presence of lesions.

Thus, it is established that patients who present infiltration of irritating drugs and extravasation of vesicant antineoplastic drugs that do not bind to DNA, would undergo a new evaluation by the nursing team within 48 hours, with possible discharge afterward, if they did not present lesions.

However, in cases of DNA-binding vesicant antineoplastic extravasation, follow-up would be performed every 48 hours for 28 days, given the potential for late injury.

It was also defined that, as it is an AE, the nurse responsible for patient care performs the nursing evolution, filling in the post-extravasation of antineoplastic drugs and the Electronic Adverse Event Notification Form, available in the Electronic Patient Record (EPR) and in the system used by the institution (MV System), respectively.

After validation of the protocol by a group of specialist nurses and the quality office, in May 2021, it was implemented at the Oncology Outpatient Clinic. It is important to note that all outpatient staff received training to recognize and treat extravasation/infiltration of anticancer drugs, thus ensuring quality care and patient safety.

DISCUSSION

To reduce the morbidity associated with extravasation, it is necessary that the entire team is informed and trained about the protocol of the Institution. Management of extravasation remains a known risk and a major challenge for chemotherapy nurses and patients receiving chemotherapy. It is important to note that regardless of the chemotherapy, the early start of extravasation treatment is mandatory.³

It is necessary for the team to be able

to guarantee the highest quality and efficiency in care, through strategies that present an effective cost-benefit, based on the best knowledge available in the literature.¹¹

Hyaluronidase, cited as one of the potential antidotes for extravasation/infiltration of antineoplastic agents, is an enzyme and, by performing the degradation of hyaluronic acid (present in the extracellular matrix), it promotes diffusion of the drug in the tissue. It is recommended for extravasations of taxanes, vinca alkaloids and etoposide.¹²

On the other hand, photobiomodulation, widely used in wound healing, can also be used to prevent tissue damage, especially in cancer patients. Its use is recommended by the Mucositis Study Group of the Multinational Association of Supportive Care in Cancer (MASCC/ISOO), being considered the best therapy for preventing and reducing the severity of oral mucositis in patients treated with chemotherapy and/or radiotherapy of the head and neck, or in a conditioning regimen for hematopoietic stem cell transplantation.¹³

In a retrospective study carried out by the same group of nurses who wrote this protocol, the effect of FBM and topical hyaluronidase on extravasation and infiltration of anticancer drugs was analyzed over a period of 21 months. 8 extravasations were reported (among them 01 of anthracycline) and 7 infiltrations. All were followed up and received an average of 2 sessions of FBM (1joule – 100mw) and topical hyaluronidase (65UTR) 3 times a day for 4 days. It was found that there was no formation of lesions even in the patient who used anthracycline.¹⁴

In an experimental study carried out with 60 Wistar rats extravasated with doxorubicin, it was observed that contraction rates were better in those treated with photobiomodulation and photobiomodulation + hyaluronidase, with healing percentage of 76.6% and 72.1%, respectively, being effective in stimulating the wound healing process.¹⁵

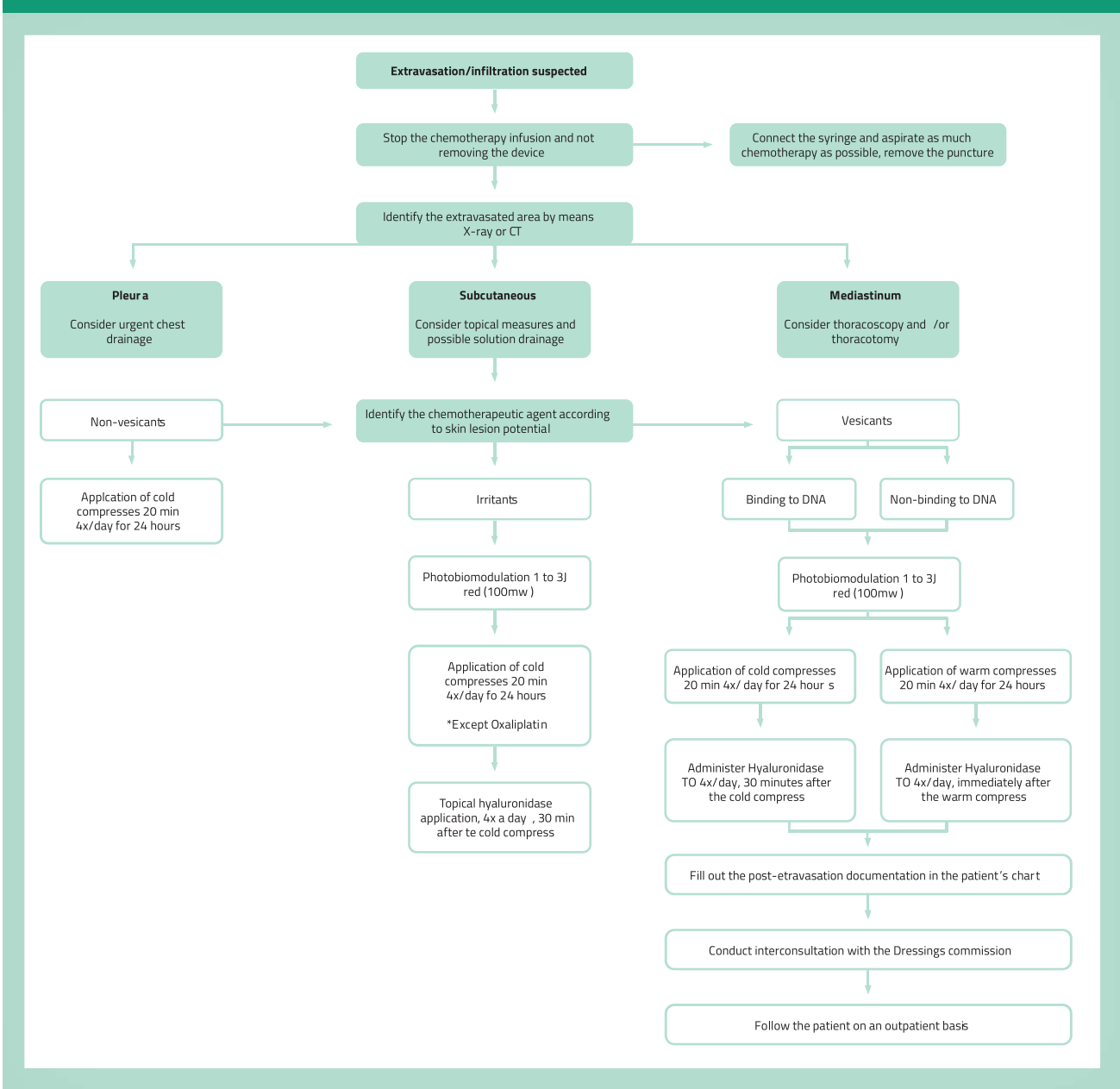
In a case report published by Vasconcelos (2013)¹⁶, late lesion formation by anthracycline extravasation was observed in a patient with adjuvant treatment of breast cancer using a central venous catheter. Antidotes, compresses or nursing care were not used to reduce the occurrence of lesion formation, as extravasation was observed only 24 hours after the event. The patient had extensive breast necrosis after 32 days, requiring a skin graft and breast reconstruction eight months later.¹⁶

Delay in care was also observed in a study carried out by Moyle (2021)¹⁷ involving anthracycline extravasation in ICU. On the first day of chemotherapy, extravasation was observed; however, a care protocol after extravasation was not performed, even though it was standardized at the Institution. In this particular case, the treatment was challenging, as the patient had axillary lymph node involvement, in which no treatment had been performed in 10 weeks and a surgical cleaning in the area could cause more extensive lesions. Conservative treatment was chosen and chemotherapy was delayed.¹⁷

Extravasation can cause significant morbidity, in addition to delay in treatment, change in prognosis, with consequent mortality.¹⁷ There are four mechanisms capable of causing leakage in fully implanted catheters, they are: incomplete needle placement and needle displacement, thrombus or fibrin sheath formation, superior vena cava perforation, and catheter fracture.¹⁸

It is important to note that the prevention of extravasation/infiltration should be part of the routine of oncology nurses. Some measures should be encouraged, such as: puncture CTI with a Hubber needle, choosing the best size according to the catheter, in order to fix it with a transparent film and change it every 7 days, when it is dirty or detached. The patient and family need to be involved in the care and instructed to notify any changes based on the signs and symptoms, so that they can understand the severity of an ex-

Figure 1. Nursing care performed during infiltration and/or extravasation of antineoplastic agents in central venous access.



Source: Prepared by the authors, 2021.

travasation.^{4,12}

It is a fact that the management of extravasation effectively by nurses will take place through education and training of protocols, ensuring patient safety. It must be supported by the Institution, in order to facilitate early intervention.³

Through training, nurses responsible

for administering chemotherapy become aware of the risks, acquire knowledge and technical skills to understand the importance of avoiding distractions and interruptions during chemotherapy administration.¹²

CONCLUSION

Prevention measures should be encouraged, however, despite being rare, extravasation in CVA can happen and its management in a timely manner is extremely important to minimize the effects of the drug on the tissue, requiring the incorporation of a care protocol. 🐦

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