

# Hypodermoclysis in oncological palliative care: systematic review

## *Hipodermóclise nos cuidados paliativos oncológicos: revisão sistemática*

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### ABSTRACT

**Objective:** This article addresses the treatment of cancer patients, referring to venous fragility induced by cancer treatment, highlighting hypodermoclysis as a therapeutic alternative to provide patient comfort, especially in cases of finitude. Subcutaneous hypodermoclysis stands out as a less invasive, safe and less expensive method for administering substances. However, there is a preference for the intravenous route in clinical practice. Hypodermoclysis has a lower incidence of complications compared to peripheral venipuncture. Therefore, greater dissemination of this knowledge and adopting hypodermoclysis in cancer patients is advisable. **Methodology:** A systematic review was carried out according to the PRISMA flowchart. Scientific articles were obtained through a search in periodicals published between the years 2012 and 2022 in the databases Scientific Electronic Library Online (SciELO), Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS) and the National Library of Medicine (Pubmed/Medline) using “hypodermoclysis” AND “palliative care” as keywords. **Results:** Six studies were analyzed, and suggest indications, contraindications, advantages and disadvantages related to subcutaneous use; comparison between peripheral venous access and hypodermoclysis techniques; administration sites; subcutaneous route prescription by professionals, interprofessional action and the pivotal role of pharmacists related to hypodermoclysis. **Conclusion:** This is a safe and effective alternative for administering medications, especially in patients with venous fragility, but many professionals neglect it. The pharmacist’s role is not just important but essential in promoting hypodermoclysis inclusion and leading initiatives for its understanding and applicability.

**Keywords:** Hypodermoclysis; Palliative Care; Comfort in Finitude; Fragile Venous Access; Oncology Patient.

### RESUMO

**Objetivo:** O presente artigo aborda o tratamento de pacientes oncológicos, referente à fragilidade venosa induzida pelo tratamento oncológico, destacando a hipodermóclise como alternativa terapêutica para proporcionar conforto ao paciente, principalmente em casos de finitude. A hipodermóclise por via subcutânea destaca-se como um método menos invasivo, seguro e menos oneroso para a administração de substâncias. Contudo, observa-se uma preferência pela via endovenosa na prática clínica. A hipodermóclise apresenta menor incidência de complicações em relação à punção venosa periférica, logo a maior disseminação

desse conhecimento e a adoção da hipodermóclise em pacientes oncológicos é aconselhável. **Metodologia:** Realizou-se uma revisão sistemática conforme o fluxograma PRISMA. Artigos científicos foram obtidos por meio de busca em periódicos publicados entre 2012-2022 nas bases de dados Scientific Electronic Library Online (Scielo), Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS) e, a National Library of Medicine (Pubmed/Medline) utilizando “hipodermóclise” AND “cuidados paliativos” como termos. **Resultados:** Seis estudos foram incluídos, e sugerem indicações, contraindicações, vantagens e desvantagens relacionadas à via subcutânea; comparação entre as técnicas de acesso venoso periférico e hipodermóclise; locais para aplicação; busca dos profissionais pela via subcutânea, ação interprofissional e papel dos farmacêuticos relacionado à hipodermóclise. **Conclusão:** Essa via é uma alternativa segura e eficaz para a administração de medicamentos, especialmente em pacientes com fragilidade venosa, porém é negligenciada por muitos profissionais. O papel do farmacêutico é essencial na promoção da inclusão da hipodermóclise, podendo liderar iniciativas para sua compreensão e aplicabilidade.

**Palavras-chave:** Hipodermóclise; Cuidados Paliativos; Conforto em Finitude; Acesso Venoso Fragilizado; Paciente Oncológico.

## INTRODUCTION

Cancer is a disease that has a significant impact on the patient, their families and the team that treats the patient, and currently, there is an increase in the number of cancer patients. One of the complications, whose impact can be sufficiently overcome, is the increase in venous fragility that the treatment can cause in the patient, which requires alternative measures to carry out the therapy and, at the same time, bring comfort to the patient, especially in cases of finitude (1,2). This suffering can have a negative impact, so the lack of knowledge and appropriate interventions can result in abandonment of treatment, anguish, and inadequate nutrition, which worsen the prognosis. Seeking and understanding the most appropriate, effective and safe interventions according to the needs of each patient is the daily mission of professionals (1,2).

Among such measures, hypodermoclysis is a less expensive, non-invasive method with rare complications related to administering substances subcutaneously and with a lower incidence of infections than the intravenous route (3,4). Hypodermoclysis consists of the subcutaneous administration of various substances (including in large volumes, depending on the puncture site), which can be carried out both in the hospital and at home. Family members can apply it after undergoing a short training to perform it within maximum efficacy and safety parameters and minimum toxicity or risk (1,2,5).

The administration of fluids subcutaneously is an old practice, the first report of which dates back to 1913; however, due to adverse effects arising from its inadequate application, such as the administration of hypertonic solutions, the intervention began to be neglected (6). In addition to the area of oncology, hypodermoclysis can be used when there is moderate dehydration caused by severe dysphagia, dementia and intestinal obstruction secondary to neoplasms. As important as the previous indications, there is the possibility of administering medications to patients who cannot puncture venous access (6).

Despite the efficacy and safety of the intravenous route, in clinical practice, administering substances via the intravenous route is prioritized when assisting in the care of palliative patients. In this sense, the characteristics that stand out are that subcutaneous application presents a lower risk of infection, greater viability and safety and reduced cost (5). Furthermore, the intravenous route requires the maintenance of a peripheral venous catheter, which demands more care and poses more risks to patient safety (5).

A study found that, among 45 patients, through descriptive observational research, there was a predominance of choosing peripheral venous access (87%) in relation to hypodermoclysis (13%) (5). Another vital evidence from this study was that the number of attempts to obtain peripheral venous access was unique in only 41% of patients

and that six or more attempts were required in the remainder, which is far from what is recommended by the National Health Surveillance Agency (ANVISA), which guides the maximum number of attempts per professional at two and, at most, four per patient (5). The difficulty in gaining access means it takes a long time to start the medication infusion, harms the weakened venous network, and increases the patient's discomfort and sensitivity to pain. The preference for the intravenous route may be related to the low dissemination of hypodermoclysis in academic and professional settings and the lack of scientific production about this route for this patient profile.

A study was carried out in the medical clinic wards of the Ribeirão Preto State Hospital and a public teaching hospital in the interior of São Paulo (2) and observed that a considerably higher number of complications and complications related to peripheral venous puncture compared to hypodermoclysis occurred, the most frequent being: catheter with expired use date, with infiltration and inadequate fixation, making it impossible to monitor the catheter insertion site. To a lesser extent, the occurrence of phlebitis was observed. It is observed that hypodermoclysis is a form of substance administration that may be more viable and offer better relative safety (2). Thus, its applicability can be considered according to guidelines and protocols guiding good clinical practices.

Considering the above, the objective of this study was to review the literature on the therapeutic benefits that the adoption of hypodermoclysis can bring to the quality of life of cancer patients and their comfort in finitude.

## METHODOLOGY

The present study was a systematic review. The study selection used the procedures recommended by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart to maintain organization and clarity in the article identification process. The search procedure consisted of the following stages: identification, selection and eligibility.

To identify the studies, the following databases were used: Scientific Electronic Library Online (SciELO), Latin American and Caribbean Literature in Health Sciences (LILACS), and the National Library of Medicine (Pubmed/Medline), in which the following search was carried out: “hypodermoclysis” AND “palliative care”, in Portuguese, including studies relevant to the topic published between 2012 and 2022.

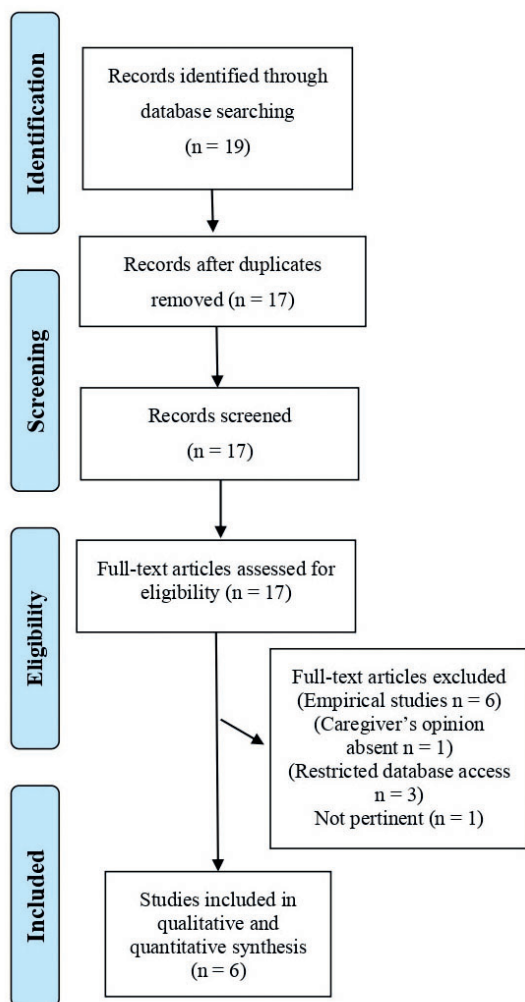
After the primary selection of articles, the titles and abstracts were analyzed, considering the inclusion criteria: online open-access articles, theses and dissertations. Articles that only had abstracts available in Portuguese were also evaluated, and when they demonstrated clarity and relevance to the purpose of the review, they were also included. The evaluation criteria used to choose the articles were clinical studies with interventions with positive or negative outcomes. Empirical studies were not included in the article, as they are acquired through everyday experience and must be more impartial. The references of the articles included as a research tool were not considered.

After selecting the articles, an exploratory reading was carried out to verify the document's relevance to the research. This was followed by an analytical reading to organize and summarize the information on the topic under study. The articles underwent an interpretative reading to relate the authors' statements to the proposed problem. The selected studies were analyzed and categorized into thematic units according to the approach of the manuscript authors.

## RESULTS AND DISCUSSION

Nineteen articles were found, two of which were duplicates. After analyzing the seventeen eligible articles, another eleven were excluded, and six references were selected for full reading. Among the eleven exclusions, six were due to being empirical articles, one article was excluded because the perception of caregivers was not considered in the work, three articles were excluded because they had restricted access to search platforms, and one article was excluded as it is not relevant to the topic studied. Figure 1 presents the flowchart of article identification, selection and eligibility.

**Figure 1.** Studies selection flowchart.



Source: the authors.

The studies analyzed are presented as the following topics: indications and advantages related to subcutaneous use; contraindications and disadvantages related to subcutaneous use; comparison between peripheral venous access and hypodermoclysis techniques; location(s) for application; prescription of the subcutaneous route by professionals, interprofessional actions and the role of the pharmacist related to hypodermoclysis.

### INDICATIONS AND ADVANTAGES

According to (3), there is a consensus among the authors that there is a challenge for health teams in the context of palliative care regarding the availability of a parenteral route for the adminis-

tration of medications when dealing with cancer patients due to the chronic evolution of the disease. Palliative care is offered to patients in the process of finitude, offering holistic care to improve patient's quality of life, as well as their caregivers and family members (2). There is no gender or age restriction, making it possible to adopt palliative care even in pediatric patients (2).

Hypodermoclysis is highlighted as an intervention that can help overcome complications frequently found when using peripheral catheter access routes, which can minimize the occurrence of phlebitis, infection at the catheter insertion site, bacteremia and sepsis (2). Again, the profile of patients in palliative care, as previously mentioned, corroborates the observation about the fragility of the venous network, which can hinder and prevent puncture. Therefore, considering other routes of administration, such as hypodermoclysis, is prudent and rational.

Hypodermoclysis is described as a simple and safe route of administration that does not cause serious complications. It involves administering medications and fluids in the subcutaneous space (7). The authors describe this route as not widespread and that more studies are needed to characterize the benefits and risks clinically. However, they emphasize that complications related to administration via peripheral venipuncture were not observed when administered subcutaneously (7).

Subcutaneous absorption occurs through blood and lymphatic capillaries in the hypodermis, thus widely used in palliative care or patients with unfeasible venous or oral access (8). This route allows better control and management of symptoms such as pain and nausea in cancer patients, in addition to maintaining adequate hydration in finitude. The author also associates subcutaneous administration with lower cost and less risk of congestion and electrolyte disturbances than intravenous administration (8).

Hypodermoclysis was most indicated for promoting comfort and pain control (42%; n = 22) and for the treatment of bacterial infections (27%; n = 14), with the leading puncture site being the region subclavicular (51.7%; n = 31), followed by abdominal (25%; n = 15) (9). The highest percentage of catheter length was observed to be between 1 and 5 days (51.7%; n = 31), followed by 6 to 10 days

(26.6%; n =16). The catheter was suspended in twelve (20%) and ten (16.7%) patients due to, respectively, phlogistic signs and accidental externalization (9). The authors highlight that the subcutaneous route is an excellent alternative for palliative care, as it avoids repeated painful punctures, which is important because the patients' venous network is often weakened (9). The authors also state that, due to the increased life expectancy of these patients with chronic diseases, it is important to seek alternative routes of medication administration, as there may be obstacles, such as the unavailability of oral and/or intravenous administration for pain control, symptoms and maintenance of hydration (9).

The benefits of hypodermoclysis in a case report of two cancer patients in which this form of administration was adopted highlight the use of the route for drug administration, pain control and electrolyte balance, which are essential for maintaining patients' quality of life (3). The study suggested that hypodermoclysis is a safe, non-invasive technique that is easy to insert and maintain, allowing for improved quality and comfort in treating patients in palliative care. Although this is a report of only two cases, individual efficacy may motivate studies with a larger sample size to better clarify the benefits and risks associated with hypodermoclysis (3).

### CONTRAINDICATIONS AND DISADVANTAGES

Hypodermoclysis fell into disuse due to adverse events related to its use, but this was due to inadequate use of the intervention (9). Hypodermoclysis is not recommended for administering large volumes, and inadequate solutions could cause fluid overload and/or circulatory shock. However, when used correctly, the subcutaneous route rarely presents complications (9). When the correct puncture technique, dilution, and infusion of medicines are adopted, this route can be very safe compared to peripheral access (2).

The following complications when using the subcutaneous route: pain and edema at the puncture site, cellulite and insufficient absorption of solutions, causing accumulation of liquid at the site, but these risks, in addition to being rare, are reversible and of little clinical relevance (7). The lack of controlled studies comparing this route with others in different clinical scenarios is also highlighted, which is necessary to provide robust evidence of the

benefits so that hypodermoclysis can later be included in protocols based on a more solid demonstration of the indications and advantages of this intervention (7).

An important disadvantage of the subcutaneous route compared to the peripheral access route is the impossibility of rapid infusion. Regarding minimizing complications, it is reported that the best-tolerated solutions are isotonic, water-soluble and with a pH close to neutrality, as these cause less tissue irritation (10).

### COMPARISON BETWEEN PERIPHERAL ACCESS AND SUBCUTANEOUS ACCESS

The following occurrences related to peripheral access were described: catheters whose expiration date had expired, infiltration of the medication into the tissue, and inadequate catheter fixation (2). Complications linked to difficulty in insertion, phlebitis or occlusion of the catheter may also occur (2). The authors draw attention to errors arising from catheter use, with inconsistency between guideline recommendations and clinical practices (2). Therefore, the selection of the administration route and its application's correct performance must be carried out in accordance with best clinical practices.

Several factors might promote possible difficulties in performing a peripheral venipuncture, ranging from demographic aspects, such as gender and age; clinical data, nutritional status, visibility and palpability of the venous network; issues related to the device used (such as model and caliber) and professional skill (7). It is observed that venipuncture can pose a significant challenge for professionals to be able to establish peripheral access on their first attempt, which implies having to make several attempts to gain access, bringing more discomfort to the patient; it is not a guarantee that access will be achieved (7).

Subcutaneous administration is more comfortable and less painful for patients. It also allows for easier handling, greater assertiveness on the first attempt, and reduced patient discomfort (10). Another advantage of this route is its indication in certain elderly patients with venous fragility who need low-volume hydration, which can be performed subcutaneously (10).

Two case reports of cancer patients pointed out that subcutaneous administration was as effective

as intravenous administration for the administration of drugs indicated in palliative care for pain control and fluid and electrolyte balance (3). The authors refer to the advantage of this route being less painful and presenting rare adverse effects, making it an option for cases in which the oral or intravenous route is unavailable (3).

### **APPLICATION LOCATIONS**

The preferable puncture sites are those that provide comfort and mobility for the patient, with the most recommended being the anterior region of the chest and the abdominal region so that the latter has a more extensive layer of subcutaneous tissue, which provides benefits to the patient and caregiver, as it tolerates the administration of large volumes and allows self-care (9). The authors draw attention to the most frequent choice of the subclavicular region in the 27 pediatric patients in their study, which may be associated with the underlying disease of some patients, which, to varying degrees, causes muscular atrophy and reduction of subcutaneous tissue in regions of the body that are usually the first puncture choice (9). The presence of a gastrostomy tube in the abdominal region in the patients in this study was another factor that led to a lower percentage of punctures in this body area (9). Other precautions refer to tissues close to surgical scars and/or subject to irradiation, which are contraindicated because the surgical incision significantly reduces lymphatic circulation, and radiotherapy can compromise the absorption of drugs and fluids. Therefore, sites where the skin surface shows signs of inflammation, edema, and regions with tumor infiltration or ulcers should be avoided.

The anterolateral region of the thigh, the abdominal region, the deltoid region, and the intraclavicular and interscapular regions as puncture sites are also suggested (10), with sterile transparent film for fixation. The authors recall that hydration is an important indication for this route, so sites with a greater capacity to receive large volumes may be preferred, as they contain more extensive subcutaneous tissue layers (10). According to the authors' report, the institution's protocol recommends that the exchange be made every five days and that the extension of the recommended period should occur in atypical situations to be evaluated by the nursing team (10). There are divergences in the literature

regarding the length of stay, with no exactly ideal time being established based on the incidence of complications and/or significant changes in effectiveness. The recommendation is that if there are signs of complications, even in recent punctures, the catheter should be changed, respecting the distance of 5 cm to the new puncture site (10).

Hypodermoclysis is a technique performed by nurses, based on the introduction of a metal or Teflon device into the subcutaneous tissue and fixed with a transparent film so that it is possible to visualize the circulating skin (3). The authors recommend a maximum length of stay for the catheter of seven days, and the location choice is made based on the volume and type of drug, making sure the thickness of the subcutaneous tissue, avoiding irradiated, infected, edematous tissue or tissue close to stomas (3).

### **PRESCRIPTION OF THE SUBCUTANEOUS ROUTE BY PROFESSIONALS, INTERPROFESSIONAL ACTIONS AND THE ROLE OF THE PHARMACIST RELATED TO HYPODERMOCLYSIS**

A small study found a significant increase in the use of hypodermoclysis, correlated with the fact that professionals at the right institution have better knowledge of the technique and its benefits; that is, professional training contributes to the use of this technique under conditions of maximum effectiveness and minimum toxicity (9). However, other authors (2) believe that hypodermoclysis, despite the advantages described compared to intravenous (greater ease of puncture, lower risk of complications), still needs to be used in clinical practice.

Another study (7) found that among 70 cancer patients in palliative care (average age 68.8 years), 90% of the punctures performed were intravenous, and complications such as local pain, extravasation and the presence of a bent or pulled catheter were present. Furthermore, no adverse effects were observed in the few patients in whom hypodermoclysis was applied. There was a predominance of peripheral venous puncture over the subcutaneous route, which is a viable, effective and safe alternative in cancer patients undergoing palliative care.

Another study (3) indicated that in the last two decades, several studies have been published in the scenario of geriatric medicine and palliative medicine, promoting hypodermoclysis as an effective

method for the infusion of liquids and administration of drugs to control symptoms in cases of patients who are unable to treatment via the oral or intravenous route, this intervention remains underused, which is reaffirmed by (10). In addition to underutilization, it highlighted the need for clinical trials on its effectiveness in the treatment of severe electrolyte disorders, as well as in the treatment of severe dehydration in patients indicated for palliative care, as a limitation of the lack of diffusion of hypodermoclysis (8).

Considering the presented scenario, a gap can be filled through awareness-raising and professional training actions of which the pharmacist can be a fundamental member. Education of the multidisciplinary team contributes to reducing limiting beliefs and expands the variety of interventions that can be selected. Thus, generating better knowledge about hypodermoclysis in treating patients in palliative care is a fundamental step toward greater access to this intervention.

The variety of knowledge applicable to hypodermoclysis involves the responsibility of pharmacists: administering medications via the subcutaneous route requires specific and fundamental knowledge about the pharmacokinetics (absorption, distribution, metabolism and excretion) of substances from this

route of administration to ensure efficacy and safety (9). Furthermore, it is necessary to disseminate knowledge about the amount of volume to be administered, infusion time, types of diluents, and method of administration, which can count on the participation of pharmacists for a careful discussion and capitation on the use of this route, thus avoiding treatment failure or low effectiveness (9).

## CONCLUSION

As knowledgeable about the characteristics of medicines with a wealth of details regarding efficacy, safety and appropriate exposure, the pharmacist can be a leading agent and enabler of the multidisciplinary team regarding the introduction of initiatives to understand hypodermoclysis better, develop internal protocols for its application together to the multidisciplinary team, and thus, contribute to ensuring the best possible care for the patient. Hypodermoclysis is a viable option and an opportunity to improve quality of life and patient care. By promoting a collaborative approach and investing in additional research, it is possible to expand the use of this technique and ensure that it benefits those who can benefit most from its adoption.

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