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RESEARCH

ADVERSE EFFECTS OF HYPODERMOCLYSIS IN ADULT PATIENTS: AN INTEGRATIVE REVIEW

EFEITOS ADVERSOS DA HIPODERMÓCLISE EM PACIENTES ADULTOS: REVISÃO INTEGRATIVA

EFECTOS ADVERSOS DE HIPODERMOCLISIS EN PACIENTES ADULTOS: UNA REVISIÓN INTEGRADORA

Paula Martina da Silva Araújo Nunes [1]
Regina Claudia Silva Souza [2]

[1] RN. Specialist in Clinical-Surgical Nursing. Family Health Strategy team coordinator. Porto Alegre, RS – Brazil.
[2] RN. MS in Nursing in the Adult´s Health. Tutor. Syrian-Lebanese Institute of Education and Research, Clinical-Surgical Residency Program. São Paulo, SP – Brazil.

Corresponding author: Regina Claudia Silva Souza. E-mail: rclaudiasouza@uol.com.br
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ABSTRACT

The hypodermoclysis is a technique indicated for mild to moderate dehydration, especially in elderly patients or those who are under palliative care. It is underutilized in clinical practice by the lack of professionals and the reporting of adverse effects. This article is an integrative review that identified articles in literature related to the adverse effects of hypodermoclysis in adult patients. A search was performed in Pubmed portal and in databases, Embase, Lilacs, Scopus, Cinahl and Scielo. They identified thirteen articles, of which five were literature reviews, three were cohort, two randomized clinical trials, one case report, a systematic review and an experience report. The most frequently reported adverse events were local pain and fluid overload in 61% of studies, local edema in 53% and cellulite by 38%. It was concluded that adverse effects were minimal and similar to the intravenous route and the technique proved to be safe and effective.

Keywords: Hypodermoclysis; Infusions, Subcutaneous; Long Term Adverse Effects.

RESUMO

A hipodermóclise é uma técnica indicada para a desidratação leve a moderada, principalmente em pacientes idosos ou que estão sob cuidados paliativos. É subutilizada na prática clínica, pelo desconhecimento dos profissionais e pelo relato de efeitos adversos. Este artigo é uma revisão integrativa que identificou na literatura artigos relacionados aos efeitos adversos da hipodermóclise em pacientes adultos. Foi realizada busca no portal Pubmed e nas bases de dados Embase, Lilacs, Scopus, Cinahl e Scielo. Identificaram-se 13 artigos, dos quais cinco foram revisões de literatura, três eram coortes, dois ensaios clínicos randomizados, um relato de caso, uma revisão sistemática e um relato de experiência. Os efeitos adversos mais relatados foram dor local e sobrecarga de líquidos em 61% dos estudos, edema local em 53% e celulite em 38%. Concluiu-se que os efeitos adversos foram mínimos e similares à via endovenosa e a técnica se mostrou segura e eficaz.

Palavras-chave: *Hipodermóclise; Infusões Subcutâneas; Efeitos Adversos de Longa Duração.*

RESUMEN

La hipodermoclisis es una técnica indicada para la deshidratación moderada, especialmente en pacientes de edad avanzada o que estén bajo cuidados paliativos. En la práctica clínica es infrautilizada debido a la falta de conocimiento de los profesionales y a informes de efectos adversos. Se trata de una revisión integradora que identificó artículos en la literatura relacionada con los efectos adversos de la hipodermoclisis en pacientes adultos. Se realizó una búsqueda en el portal Pubmed y en las bases de datos Embase, Lilacs, Scopus, Cinahl y Scielo. Se identificaron trece artículos de los cuales cinco eran revisiones de la literatura, tres de cohortes, dos ensayos clínicos aleatorios, un relato de caso, una revisión sistemática y un relato de experiencia. Los efectos adversos más relatados eran dolor local y sobrecarga de líquidos en el 61% de los estudios, edema local en 53% y celulitis en un 38%. Los resultados permiten concluir que los efectos adversos son mínimos y similares a la vía intravenosa y que la técnica es segura y eficaz.

Palabras clave*: Hipodermoclisis; Infusiones Subcutáneas; Efectos Adversos a Largo Plazo.*

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INTRODUCTION

The hypodermoclysis or subcutaneous fluid infusion therapy was widely used in the first half of the twentieth century. However, after some serious side effects, its use was discarded. It consists of a liquid infusion technique in the subcutaneous tissue that requires minimal technology. Currently, it has been incorporated into clinical practice for its considerable benefits and the increase in the number of elderly and people with cancer or other comorbidities that require a new perspective of care, such as palliative and home care.[1]

Studies show that hypodermoclysis is an effective method for the mild to moderate dehydration treatment and administration of some medication. To integrated it with the assistance and contribution in the treatment of people who need this intervention, knowledge and instrumentalization of professional teams are important. This includes knowing its main adverse effects since it was one of the factors that had repercussions in its underutilized for several years. Another reason for the low adherence of the technique by health services is the lack of knowledge of professionals regarding the main aspects involved in its use.[1,2]

The motivation to study this topic was because it is a practice little known by the health team and not less important than the other ways of administration and it can be used as an alternative treatment. Although it is rare and avoidable, discussing the incidence and impact of adverse events during the treatment performed with hypodermoclysis can benefit the increase in its adherence.

The dissemination of this knowledge to professionals is relevant and contributes to a safe and effective care. Therefore, the aim of this study was to identify the literature articles related to adverse effects of hypodermoclysis in adult patients.

METHOD

Integrative literature review that identified studies on the adverse effects of hypodermoclysis in adults and consisted of six stages recommended for this method.[3]

1st stage – elaboration of guiding question; 2nd stage – search or sampling of the literature; 3rd stage – data collection/definition of the information to be extracted from the selected articles; 4th stage – critical analysis of the studies included from organized approach to consider the severity and characteristics of each study hierarchically by analyzing the levels of evidence; 5th stage – discussion of results, comparing the data analyzed in the studies; and the 6th stage – the presentation of the integrative review.[4] The guiding question was: "What is the evidence of adverse effects in hypodermoclysis in adult patients?"

The PICO strategy, recommended to find an appropriate response to questions[5], was considered for the preparation of the search methodology of the construction process. In this strategy, PICO means P – patient, I – intervention, C – comparison group and O – outcome. Therefore, for this study, it was set as P – adult patients, I – hypodermoclysis, C – it was not applied to this guiding question and O – adverse effects. This strategy was adapted according to the portal or database, using or not of quotation marks, parentheses, or descriptor, with the issue of the study and the previously established inclusion criteria a the guiding principles.

The search was conducted in Medical Exerpta databases (EMBASE), Latin American and Caribbean Health Sciences (Lilacs), Elsevier SciVerse Scopus (Scopus) and Cumulative Index Health Literature (CINAHL), Scientific Electronic Library Online (Scielo), the Cochrane Library and Portal National Library of Medicine (PubMed).

The articles were located according to the descriptors hypodermoclysis, subcutaneous infusions, adverse effects, according to Health Sciences Descriptors (DECS) and Medical Subject Headings (MESH) and using the combination hypodermoclysis AND infusions, subcutaneous AND adverse effects. It was also used the keyword hypodermoclysis Lilacs, Scielo, and Embase because the combination cited above did not achieve results in these bases.

The inclusion criteria were articles published in national and international scientific journals that have addressed the hypodermoclysis topic and adverse effects on the population of adults in Portuguese, English and Spanish, without delimitation of study time by the reduced number of publications related to the topic. Also, the articles were selected by the importance of the identification of the adverse effects of the technique from the beginning of its use. As for the exclusion criteria, articles related to the use of hypodermoclysis in animals and children, editorial and letter-response were excluded.

The data collection was carried out by two researchers at different times, through online access, between July 2014 and April 2016, and a previously developed tool in Microsoft Office Excel 2010 software was used that contained the following variables: title of the article, authors, journal, year of publication, country of origin of the study, study design, level of evidence and grade of recommendation, adverse effects, and conclusion.

The methodological steps towards the selection of the articles are detailed in Figure 1.

The methodological quality of each study was classified according to the levels of the Oxford Centre for medicine based on the evidence.[6]

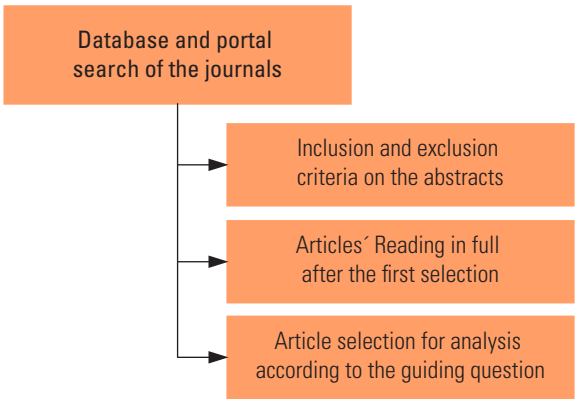

Figure 1 - Flowchart of the methodological steps taken to select the articles.

RESULTS

When performing a databases search strategy as the combination is elected, there were 47 studies identified. Five of them were repeated in more than one base. In databases where there was any study found with the described search strategy, it was only used the word hypodermoclysis, which resulted in three studies in Lilacs (Table 1).

Table 1 - Quantitative (n) of articles found (F) when the search strategy was held and selected articles (S) after the inclusion and exclusion criteria. São Paulo, SP, 2016

Database	Descriptors		Keywords		Total
	Hypodermoclysis AND infusions subcutaneous AND adverse effects		Hipodermóclise		
	F	S	F	S	
Cinahl	15	6	–	–	15
Cochrane	0	0	0	0	0
Embase	0	0	0	0	0
LiLACS	0	0	3	0	3
Pubmed	16	3	–	–	16
Scopus	11	7	–	–	11
SciELO	2	1	0	0	2
				Articles found	47
				Articles selected	17

These studies were submitted to the inclusion and exclusion criteria associated with the reading of the abstracts, and there were 17 articles found. With the reading of the 17 articles in full, four of them were not selected because they did not address the adverse effects, resulting in 13 articles.

The selected articles are in Cinahl, and Scopus databases; two studies in Pubmed, one of them being found in Cinahl and the other in Scielo. It is noteworthy that the three articles found in Lilacs, none of them was selected, and only one study was identified in Scielo.

The studies distribution according to their design, the degree of recommendation and level of evidence shows a predominance of literature review studies with a total of five articles, followed by three cohort studies, two randomized clinical trials, one case report, one systematic review and an experience report article (Table 2). The only systematic review found was a limited study to English. The Medline electronic database assessed case-control studies. This may have affected the results since other studies were not included. Observational and cohort studies are ideal for measuring incidence, etiology and risk factors. However, they are expensive studies that take considerable time to perform, which may explain their small number.

As the year of publication, the studies are between 1990 and 2010, highlighting the largest number of publications (eight) from 2000. The studies with higher levels of evidence and grade of recommendation are those that were published in the 1990s. Even with the highest number of publications during the 2000s, they predominantly reviewed articles that are categorized as a grade of recommendation D and level of evidence 5.

The countries where the studies were carried out were Canada with the highest number (four studies), followed by the United States of America (USA) and Israel with two. Germany, Brazil, Ireland, United Kingdom and Cuba had one study each.

Among the most frequently reported adverse effects there are local pain and fluid overload in 61% of the studies analyzed, local edema in 53% and cellulite by 38%. Other reactions such as infection, hyponatremia, infiltration/extravasation, hyperemia, obstruction, erythema, bruising, the reaction at the puncture site, inadvertent puncture of vessels, bleeding and insufficient absorption fluid accumulation in the subcutaneous was reported in 23% of the studies. Complications described were less heart failure, inflammatory signs, bowel perforation, abscess, hematoma, pruritus, rash, circulatory shock, pulmonary edema, tissue necrosis and burning sensation, had an incidence of 7.6%. Also, there were described cases of shock after the infusion of hypotonic and hypertonic solutions, change in electrolyte concentration and side effects of hyaluronidases.

Table 2 - Articles selected for analisys. São Paulo, SP, 2016

Article / Country	Journal / Year	Study design	Database	Recommendation degree	Level of evidence
E1. Lopez, J.H., Reyes-Ortiz, C.A.Subcutaneous hydration by hypodermoclysis. EUA	Reviews in Clinical Gerontology 2010.	Literature review article	Scopus	D	5
E2. Arinzon, Z., Feldman, J., Fidelman, Z., Gepstein, R., Berner, Y.N. Hypodermoclysis (subcutaneous infusion) effective mode of treatment of dehydration in long-term care patients. Israel	Archives of Gerontology and Geriatrics/ 2004	Prospective cohort	Scopus	B	2C
E3. Slesak, G., Schnürle, J.W., Kinzel, E., Jakob, J., Dietz, K. Comparison of subcutaneous and intravenous rehydration in geriatric patients: A randomized trial. Alemanha	Journal of the American Geriatrics Society/ 2003	Randomized Clinical Trial	Scopus Cinahl	A	1B
E4. Sasson, M., Shvartzman, P. Hypodermoclysis: An alternative infusion technique.Israel	American Family Physician/2001	Literature review article	Scopus	D	5
E5. Dasgupta, M., Binns, M.A., Rochon, P.A. Subcutaneous fluid infusion in a long-term care setting. Canadá.	Journal of the American Geriatrics Society/ 2000	Prospective cohort	Scopus Cinahl	B	2C
E6. Junior, A.F., De Paula, A.P., Feldman, D., Nasri, F. Subcutaneous hydration by hypodermoclysis. A practical and low cost treatment for elderly patients. Brasil	Drugs and Aging/ 2000	Literature review article	Scopus	D	5
E7. Rochon, P.A., Gill, S.S., Litner, J.,[...], Goodison, A.J., Gordon, M. A systematic review of the evidence for hypodermoclysis to treat dehydration in older people.Canadá	Journals of Gerontology - Series A Biological Sciences and Medical Sciences/ 1997	Systematic review	Scopus	B	3A
E8. O'Hanlon S, Sheahan P, McEneaney R. Severe hemorrhage from a hypodermoclysis site. Irlanda	Am J HospPalliat Care/ 2009	Case report	Pubmed Cinahl	C	4
E9. Lybarger EH. Hypodermoclysis in the home and long-term care settings. EUA	Journal of infusion Nursing. 2009.	Literature review article	Cinahl	D	5
E10. Bruera E; de Stoutz ND; Fainsinger RL; Spachynski K; Suarez-Almazor M; Hanson J. Comparison of two different concentrations of hyaluronidase in patients receiving one-hour infusions of Hypodermoclysis. Canadá	Journal of Pain Symptom Manage/1995.	Randomized Clinical Trial	Cinahl	A	1B
E11. Bruera E; Legris MA; Kuehn N; Miller MJ. Hypodermoclysis for the administration of fluids and narcotic analgesics in patients with advanced cancer.Canadá	Journal of Pain and Symptom Management/1990	Experience report	Cinahl	C	4
E12. Abdulla A; Keast J. Hypodermoclysis as a means of rehydration. ReinoUnido. ReinoUnido	Nursing Times/ 1997	Literature review article	Cinahl	D	5
E13 Perera AH, Smith CH, Perera AH. Hypodermoclysis in patients presenting with terminal cancer. Cuba.	Revista Cubana de Medicina. 2011	Prospective cohort	SciELO	B	2C

DISCUSSION

The hypodermoclysis is considered a safe hydration technique, effective and useful, especially in situations where access to the venous area is very difficult and/or that patients cannot tolerate oral intake.[7] It was commonly used in the 1950s, mainly in the elderly population, but it was marginalized, and its use was incorporated into clinical practice. This fact probably happened because of the lack of professionals on the technical and description of some serious adverse effects, which were related to the type of solution. In the current studies, adverse effects had low incidence and similar to the intravenous technique.[7,8]

This underutilization of the procedure is also associated with lack of studies on the topic, observed when this review was carried out. The knowledge based on evidence strengthening the practice and demystifying misconceptions. In research conducted with nurses about their knowledge regarding hypodermoclysis, it was found that these professionals do not have information on the topic and are unaware of the main aspects involved in the care. The professionals most informed with the technique are those working in palliative care units.[9]

With increasing longevity of the population and the number of people with cancer and chronic diseases requiring palliative care, this technique has become an interesting option, and it has been rescued to its use in some conditions. Some studies conducted in long-staying institutions with geriatric patients aimed at evaluating the benefits of the technique have concluded that it is feasible in this population, particularly in conditions of delirium and home treatment.[10-12] This aspect is important because it can prevent hospitalizations caused by dehydration, reducing health system costs and reducing the time and the need for supervision of the nursing staff, thus contrib-

uting to better quality of life of these patients due to decreased need for physical restraints.[13-15]

Regarding the adverse events most frequently reported in the studies of this review, there is pain and swelling at the puncture site, cellulitis and insufficient absorption of the solution to fluid accumulation on the site. These risks are minimal, reversible and of little clinical importance. These reactions can be treated by local massage, reduction of infusion rate and change of the puncture site.[8] Fluid overload was also mentioned in some publications, and it is associated more with the patient´s condition than necessarily technical.[12,14,16-20] To prevent this complication, the use of reduced volumes and periodic observation of the patient´s hydration level may be enough.[20]

The reported adverse effects often occur after three days of treatment in a single subcutaneous site and may also be caused by an erroneous puncture.[8] It is recommended that the technique is carried out by appropriately qualified professionals, as their care device insertion site, guides to inspect the site systematically, and the needle length of time should be between 48 and 96 hours. It is also recommended to choose regions with more amount of subcutaneous tissue.[21]

When these effects are compared to the intravenous therapy, both techniques are equally effective, and their adverse effects are similar.[11,17] It is interesting that fewer adverse events were observed in treatment with solutions containing electrolytes.[14,22]

It was also noticed that the reactions are common in the analyzed studies, but it was necessary to conduct research with a more rigorous methodology for the technique to be consolidated in practice. In this review, 42% of the studies have recommendation grade D and level of evidence 5, which implies methodologically weak studies whose results do not provide security and consistency to be inserted in care.

Another important factor is the years of publication of the studies, most of them from 2000, but mainly review articles, showing a gap in recent research.

In a recent literature review conducted with the purpose of discussing the use of a subcutaneous way in clinical practice with patients in palliative care, the authors concluded that it is essential to carry out studies with clinical trial design to clarify the doubts that persist about the technique. The involvement of professionals in the production of this knowledge is also important.[23]

Some rare complications were related, such as cases of shock, intestinal perforation, changes in electrolyte concentration, excessive bleeding and tissue necrosis. They are specific events that may have occurred due to operational failures in the technical and clinical conditions of the patients.[12,16,22,24]

A significant point of this review is that the greatest number of studies (four) was held in Canada. That country has a health model that is a world reference for public health policies, a pioneer in several segments, such as family medicine with a focus on primary health care and in the community, which triggers a strong process of deinstitutionalization.[25] One aspect that deserves attention is the small number of publications on Latin America databases reflecting a research deficit on the subject on the continent.

The hypodermoclysis is mainly used in conditions where patients can be treated at home and taken care by people not connected to the professional area of health, as caregivers and family. This is also one of the advantages of the technique. In Brazil, there is a fledgling culture of home and palliative care, which explains the low number of publications on the theme, illustrated in this study for just one article.

A cohort study of patients with terminal cancer showed that the subcutaneous way has a low incidence of adverse effects and complications.[20] Currently, considering important aspects related to health care involving patient safety, autonomy and their quality of life, this perspective treatment should be considered as a significant alternative. It allows not only the treatment at home, but also it helps to preserve the functionality of the people because they can perform basic life activities such as walking, their hygiene and food due to the discontinuation of treatment. Moreover, the treatment at night can be performed, coinciding with sleep and preserving it.[20]

CONCLUSION

This study concluded that the adverse effects of hypodermoclysis in adult patients reported in the literature did not cause serious damage to patients, and most of them are minimal and reversible. That is, the minimum adverse effects are conditions in which the patient does not present complications that can cause serious and/or moderate damage in their medical condition requiring complex interventions. Complications causing serious adverse effects in the papers were less frequent, and in many of them, there was no consistent evidence that might be associated with the technique. The adverse effects found in the studies showed low incidence and they are similar to the intravenous way, showing that hypodermoclysis is safe and effective for moisturizing and analgesia for specific clinical situations.

New research with better levels of evidence and more rigorous methodological quality are required to support the practice, including to understand issues related to adverse effects, patient safety, the effectiveness of the technique and its impact on quality of life for patients, caregivers, and the family. These dimensions are essential for effective health care.

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