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Original article

Analysis of intravenous therapy and hypodermoclysis in hospitalized older adults

Análise do uso de medicamentos por via intravenosa periférica e hipodermóclise em pessoas idosas hospitalizadas

Análisis de la terapia intravenosa y de la hipodermoclisis en ancianos hospitalizados

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Abstract

Objective: This study investigated the prevalence and complications of intravenous and hypodermoclysis therapy in hospitalized older adults. **Methods**: A cross-sectional study conducted at a hospital in Porto Alegre, Brazil, it included 202 patients ≥ 60 years old who received intravenous therapy > 48 hours and/or hypodermoclysis. An instrument was used to collect sociodemographic, clinical and therapy-related data. Descriptive analysis and inferential statistics were used. **Results**: Intravenous therapy predominated (95.5%), with a median of 3 medications. Complications only occurred in intravenous therapy, with grade II phlebitis being the most prevalent (54.3%) and grade I infiltration occurring in 1% of the cases. **Conclusions**: Despite its safety, hypodermoclysis is still little used in clinical practice. There was a high prevalence of intravenous use, although the same medications could have also been administered via hypodermoclysis.

Descriptors: Hypodermoclysis; Catheterization, Peripheral; Aged; Nursing; Patient Safety

Resumo

Objetivo: investigar prevalência e complicações do uso de medicamentos por via intravenosa e por hipodermóclise em pessoas idosas hospitalizadas. **Método:** estudo transversal, realizado em hospital de Porto Alegre com amostra de 202 pacientes ≥ 60 anos; terapia intravenosa em período superior a 48 horas de punção e/ou hipodermóclise, com prescrição medicamentosa compatível pelas duas vias. Na coleta utilizou-se um instrumento com variáveis sociodemográficas, clínicas e relacionadas à terapia. A análise foi estatística descritiva e inferencial. **Resultados:** predomínio do uso de medicamentos por via intravenosa (95,5%), mediana de três medicamentos. As complicações foram apenas da terapia intravenosa, sendo a flebite grau II mais prevalente (54,3%) e infiltração grau I em 1% dos casos. **Conclusão:** a hipodermóclise, apesar de ser uma via segura, ainda é pouco utilizada na prática clínica. Houve alta prevalência do uso da via intravenosa, apesar de que os medicamentos utilizados também poderiam ser administrados por hipodermóclise.
Descritores: Hipodermóclise; Cateterismo Periférico; Idoso; Enfermagem; Segurança do Paciente

Resumen

Objetivo: investigar prevalencia y complicaciones del uso de medicamentos por vía intravenosa y por hipodermoclisis en ancianos hospitalizados. **Método:** estudio transversal realizado en hospital de Porto Alegre, Brasil, con una muestra de 202 pacientes ≥ 60 años sometidos a terapia intravenosa por más de 48 horas de punción y/o hipodermoclisis, con prescripción medicamentosa compatible por ambas vías. Para la recolección se utilizó un instrumento con variables sociodemográficas, clínicas y relacionadas a la terapia. El análisis fue estadístico, descriptivo e inferencial. **Resultados:** predominio del uso de medicamentos por vía intravenosa (95,5%), mediana de tres medicamentos. Hubo complicaciones solamente en la terapia intravenosa, siendo flebitis grado II la más prevalente (54,3%), e infiltración grado I en 1% de los casos. **Conclusión:** la hipodermoclisis, aunque sea segura, es todavía poco utilizada en la práctica clínica. Hubo alta prevalencia de uso de la vía intravenosa, aunque los medicamentos utilizados también podrían administrarse por hipodermoclisis.
Descriptores: Hipodermoclisis; Cateterismo Periférico; Anciano; Enfermería; Seguridad del paciente

Introduction

The world's older adult population is growing at approximately 3% per year, and according to estimates it will reach 2.1 billion by 2050.[1] There are currently around 962 million people aged ≥ 60 in the world, representing 13% of the total

population. In Brazil, 13% of the population is > 60 years of age, and this rate is expected to reach 29.3% by 2050.[1]

By 2030, it is projected that the older adult population will increase in both age groups (60-64 years: women 3.10%, men 2.73%; 65-69 years: women 3.06%, men 2.59%) in the state of in Rio Grande do Sul at a higher rate than in Brazil overall (60-64 years: women 2.76%, men 2.43%; 65-69 years: women 2.43%, men 2.04%).[2]

The Older Adult Statute, passed in 2003, affirms the right of older adults to healthy aging with respect and dignity, including physical, mental, and moral integrity, providing for comprehensive health care in association with initiatives and services to promote older adult health, especially diseases that primarily affect older people.[3]

Despite its heterogeneity, the aging process consists of a sequence of morphological, functional, and biochemical changes that exhaust functional capability and lead to greater vulnerability to disease.[4] Chronic disease, considered a 21st century epidemic, is the main cause of mortality and morbidity worldwide.[4] These diseases require a long-term response that must be coordinated by health professionals with specific training, such as nurses.[5]

Nursing, which is linked to all phases of the care plan, including medication, plays a vital role in error prevention, which is an important factor for patient safety.[5] Nurses are responsible for administering intravenous therapy, including initial access and therapy monitoring, which must be performed carefully and attentively, considering the patient's well-being and safety.[6] However, caution is required, since complications can increase the risk of morbidity and mortality.[7]

The World Health Organization's Global Patient Safety Action Plan 2021-2030 is developing strategies to prioritize patient safety, given that the harm caused by unsafe care is a global public health challenge and one of the main causes of death and disability in the world.[8]

Preferably, continuous or intermittent drug infusions should be administered orally in older adults, due to the ease of access and because it is the most physiological and least invasive route, in addition to being less painful and involving fewer adverse effects. However, some older patients cannot take medicine orally due

to dysphagia and venous access is not possible in others due to a weak vascular network. The subcutaneous route is another way to administer solutions and medications.[9]

However, intravenous therapy is still commonly used in hospital care to administer drugs, fluids, blood, and nutritional components through a range of devices, such as peripheral intravenous devices/catheters.[10] However, it must be recognized that physiological changes associated with the aging process affect medication doses, volumes, action, interactions, and adverse effects, as well as the response to infusion therapy.[11] Peripheral catheterization can lead to local and systemic complications, including: phlebitis, infiltration, extravasation, nerve damage, occlusion, infection, embolism, venous thrombosis, poor device positioning, and catheter-related skin damage.[11]

Phlebitis is defined as "inflammation of a vein [which] may be accompanied by pain/tenderness, erythema, edema, purulence, and/or palpable venous cord".[12:S211] The Infusion Nurses Society has developed a standardized, valid, reliable, and clinically viable Phlebitis Scale. This scale was translated into European Portuguese in 2016, with satisfactory validity results.[13]

Infiltration is defined as the "inadvertent infiltration of vesicant solution or medication into surrounding tissue".[12:S207] The Infiltration Scale rates clinical criteria for this complication on a 5-point scale. In 2016, the Infiltration Scale was translated and adapted into Portuguese to determine its validity and reliability in clinical practice.

Hypodermoclysis, an alternative to peripheral venous access, takes the frail vascular network of older adults into consideration, avoiding associated complications. This route is less painful, easier to manage, and involves a lower chance of complications. Volume absorption occurs through hydrostatic and osmotic forces that allow the solution to reach the intravascular space.[9] Given its therapeutic efficacy, hypodermoclysis provides greater comfort and preserves patient autonomy. It is a quick, simple, and safe method with good cost-effectiveness, which can be implemented in a hospital or at home.[9] Complications of this method can include erythema, swelling, leakage, local bleeding, bruising, burning, abscess, and pain.[11]

Despite being considered an excellent route of drug administration, hypodermoclysis is still little used in clinical practice.[15] Therefore, this study's objective was to investigate the prevalence and complications of peripheral intravenous medications and hypodermoclysis in hospitalized older adults.

Methods

This quantitative cross-sectional study was conducted in inpatient units of a university hospital in Porto Alegre, Brazil. The hospital has 6 adult inpatient units, totaling 148 beds. Data collection was carried out directly from the medical records of unit patients from May to August 2021.

The sample consisted of hospitalized older adults, meeting the pre-established criteria for a minimum sample of 197 patients, based on an average of 398 hospitalized patients per month, a sampling error of 5%, an estimated older adult population of 50% in these units, and a significance level of 5%. The study inclusion criteria were: age ≥ 60 years; peripheral intravenous therapy and/or hypodermoclysis therapy; a hospital stay and catheter use time > 48 hours and prescribed medications compatible with infusion via subcutaneous and intravenous routes.

The records of patients aged ≥ 60 years with a length of stay > 48 hours were assessed to determine whether they were prescribed medications for intravenous therapy and/or hypodermoclysis. Patients prescribed intravenous medications for which hypodermoclysis infusion was not recommended were excluded from the study.

Patients who did not respond coherently to questions about their full name, age, and location were also excluded, as were those who could not respond to questions about symptoms (eg, pain at the intravenous device or hypodermoclysis insertion site) and those with incomplete electronic medical records or who were hospitalized in isolation wards.

The variables were a) sociodemographic: age, sex, race, and education; b) clinical: comorbidities and reason(s) for hospitalization; and c) hypodermoclysis-related: date and time of application, catheter type (Abbocath® or butterfly),

puncture site, fixation type, fixation adherence, visualization of the insertion site, identification of the puncture site, maintenance type (serum therapy or saline solution), medication class according to the Anatomical Therapeutic Chemical classification system,[16] complications (local edema, erythema, abscess, local bleeding, bruising, leakage, local reaction to the catheter, pain or discomfort at the insertion site, and infection); and d) peripheral intravenous therapy: date and time of puncture, needle gauge, puncture site, fixation type (sterile/transparent, sterile/non-transparent, non-sterile/non-transparent and micropore or adhesive tape), fixation adherence, visualization of the insertion site, identification of the puncture site, maintenance (serum therapy or saline solution), medication classification according to the Anatomical Therapeutic Chemical system.[16] Complications were classified as phlebitis/grade,[13] infiltration/grade,[14] extravasation, obstruction, and hematoma.

Data collection was performed by trained researchers who were authorized by the institution to access medical records. All participants provided written informed consent and all ethical and legal precautions were taken to guarantee participant privacy. One puncture per patient was assessed. If intravenous and hypodermoclysis routes were used simultaneously or at different times, both were included in the evaluation. New punctures after this assessment were not included.

To determine the relationship between complications arising from drug therapies, medical prescriptions from the previous 24 hours were analyzed for each older adult. Monitoring was performed through a data collection instrument consisting of patient-related and therapy-related variables, direct participant and device assessment for both intravenous therapy and hypodermoclysis, and medical record analysis. The Portuguese versions of the phlebitis and infiltration scales were applied during the assessment.[13-14]

The collected data were entered into an Excel spreadsheet (Microsoft, Redmond WA, USA), inconsistency analysis was performed, and they were then exported to IBM SPSS Statistics 20.0 (IBM, Armonk, NY, USA) for statistical analysis. Descriptive and inferential statistical tests were performed. The descriptive analysis included measures of central tendency (mean and median) and variability (SD and

range) for continuous numerical variables, while absolute and relative frequency were used for categorical variables.

Data symmetry was analyzed with the Kolmogorov-Smirnov and Shapiro-Wilk tests for continuous variables; median and range were used for asymmetrically distributed data and mean and SD were used for symmetrically distributed data. Inferential analysis consisted of Pearson's chi-square or Fisher's exact test, using a 5% significance level. The prevalence of complications was determined using the following formula: prevalence = (number of new cases [complications] in a given period/the number of people exposed to the risk during the same period)/100.

This study was approved by the institutional ethics committee (opinion 4,372,085/CAAE 39507120.1.0000.5336) and conformed to Ministry of Health resolution 466/2012. All participants provided written informed consent, and the researchers signed a data usage contract committing them to the precepts of the General Data Protection Law.

Results

A total of 202 older adults were assessed. The sex distribution was similar (54.5% women), the median age was 72 years (minimum 60, maximum 103), and the majority were White (83.7%). Education level was not recorded in the majority (67.8%) of the medical records; 26.6% were literate.

Table 1 presents the results for the clinical variables. The patients were generally hospitalized for a single reason and reported ≤ 3 comorbidities. The most frequent comorbidities were systemic arterial hypertension (n = 131; 64.8%) and diabetes mellitus (n = 62; 30.7%). A median of 3 medications were administered intravenously (minimum 1, maximum 9), while a median of 1 was administered by hypodermoclysis (minimum 1, maximum 4).

Table 1 - Clinical and administration route variables for medications prescribed to hospitalized older adults. Porto Alegre, RS, Brazil, 2021. n = 202

Variables	n	%
Reasons for hospitalization		
1	128	63.4
2-5	74	36.6
Comorbidities		
≤ 3	111	55.0
4-10	91	45.0
Therapy type (n = 203)*		
Peripheral intravenous	194	95.5
Hypodermoclysis	9	4.5
Total intravenous medications		
≤ 3	104	51.5
4-9	90	44.6
Total hypodermoclysis medications		
1	5	55.6
2-4	4	44.4

* One patient was receiving both intravenous therapy and hypodermoclysis.

Intravenous access was predominantly in the left arm, with the most common region being the cubital fossa (43.8%); the majority of the medical records did not identify the region of placement (53.1%) or the catheter gauge (n = 58.5%). In the vast majority of cases, the fixation type was sterile non-transparent dressing (92.8%), and saline was used for catheter maintenance (93.3%) (Table 2).

The most predominant gauge used in hypodermoclysis was 24. In all cases, sterile transparent dressing was used for fixation, puncture identification was confirmed in 77.8%, and dressing adherence was correctly performed in all patients. The puncture site was visualized in 55.6% of the patients (Table 2).

Table 2 - Characteristics related to route of medication administration in hospitalized older adults. Porto Alegre, RS, Brazil, 2021. n = 202

Variables	Peripheral intravenous catheter		Hypodermoclysis	
	n	%	n	%
Catheter gauge				
18	7	3.6	-	-
20	14	7.3	-	-
22	46	23.8	1	11.1
24	13	6.7	7	77.8
Not reported	113	58.5	1	11.1
Puncture side				
Right	91	46.9	-	-
Left	103	53.1	-	-
Puncture region				
Abdominal	-	-	5	55.6
Anterolateral thigh	-	-	2	22.2
Forearm	60	30.9		
Arm	6	3.1		
Hand	43	22.2		
Cubital fossa	85	43.8		
Subclavicular	-	-	2	22.2
Catheter fixation				
Non-transparent and non-sterile dressing	12	6.2	-	-
Sterile non-transparent dressing	180	92.8	-	-
Sterile transparent dressing	2	1.0	9	100
Dressing adhesion				
Adequate	163	84.0	9	100
Inadequate	31	16.0	-	-
Visualization of the puncture site				
No	194	100.0	4	44.4
Yes	-	-	5	55.6
Puncture identification				
No	103	53.1	2	22.2
Yes	91	46.9	7	77.8
Puncture maintenance				
Saline	181	93.3	9	100
Continuous serum therapy	13	6.7	-	-

Phlebitis was the most common complication of intravenous therapy (23.7% prevalence), with grade II being the most common type (54.3%). Infiltration only occurred in 1% of the cases (grade I only). No cases of hematomas, catheter occlusion, infiltration, or extravasation were reported. No complications were reported in hypodermoclysis (Table 3). There was no significant difference between demographic,

clinical, and administration route variables regarding the occurrence of phlebitis ($p > 0.05$).

Table 3 - Frequency of complications from peripheral intravenous therapy and hypodermoclysis in hospitalized older adults. Porto Alegre, RS, Brazil, 2021. n = 202

Variables	Peripheral intravenous therapy n = 194*	Hypodermoclysis n = 9
	n (%)	n (%)
Phlebitis		
Yes	46 (23.7)	-
No	148 (76.3)	-
Degree of phlebitis		
I	17 (37)	-
II	25 (54.3)	-
III	4 (8.7)	-
Infiltration		
Yes	2 (1.0)	-
No	192 (99)	-
Degree of infiltration		
I	2 (100)	-

* One patient was receiving both intravenous therapy and hypodermoclysis.

No association was found between sociodemographic, clinical, or therapy-related variables and complications ($p > 0.05$).

Table 4 shows the association analysis results between Anatomical Therapeutic Chemical system drug class and intravenous therapy-related complications (phlebitis and infiltration). There were no significant associations between medication class and complications ($p > 0.05$). The results were the same when the medications from each class were analyzed individually ($p > 0.05$).

Table 4 – Association between Anatomical Therapeutic Chemical medication class and intravenous therapy complications. Porto Alegre, RS, Brazil, 2021. n = 202

Use of medications according to Anatomical Therapeutic Chemical classification	Phlebitis		*p*	Infiltration		*p*
	No n (%)	Yes n (%)		No n (%)	Yes n (%)	
Cephalosporin/antimicrobial carbapenem						
No	134(75.3)	44(24.7)	0.367*	176(98.9)	2(1.1)	1.000**
Yes	14(87.5)	2(12.5)		16(100)	-	
Antiemetics/propulsives						
No	13(68.4)	6(31.6)	0.401*	18(94.7)	1(5.3)	0.187*
Yes	135(77.1)	40(22.9)		174(99.4)	1(0.6)	
Non-opioid analgesics						
No	10(71.4)	4(28.6)	0.744*	13(92.9)	1(7.1)	0.139*
Yes	138(76.7)	42(23.3)		179(99.4)	1(0.6)	
Opioid analgesics						
No	86(77.5)	25(22.5)	0.619**	110(99.1)	1(0.9)	1.000*
Yes	61 (74.4)	21(25.6)		81(98.8)	1(1.2)	
Combination electrolytes and solutions						
No	70(75.3)	23(24.7)	0.749**	92(98.9)	1(1.1)	1.000*
Yes	78(77.2)	23(22.8)		100(99)	1(1)	
Diuretics						
No	136(75.6)	44(24.4)	0.526*	178(98.9)	2(1.1)	
Yes	12(85.7)	2(14.3)		14(100)	-	1.000*
Corticosteroids						
No	144(75.8)	26(24.2)	0.574*	188(98.9)	2(1.1)	
Yes	4(100)	-		4(100)	-	1.000*
Antipsychotics						
No	148(76.3)	46(23.7)	-	192(99)	2(1)	-
Yes	-	-		-	-	

* Fisher's exact test**Pearson's chi-square test

The most common intravenous medications were non-opioid analgesics (dipyrone [92.8%]) and antiemetics/propulsives and (metoclopramide [67.6%]). The most commonly used medications in hypodermoclysis were opioid and non-opioid analgesics and antiemetics/propulsives: morphine (77.8%), dipyrone (33.3%), metoclopramide (22.2%), and ondansetron (22.2%).

Discussion

This study explored the use of parenteral therapies, considering that the intravenous route is recommended and routinely used for administering drugs, fluids, blood, and nutritional components in the hospital context, and that hypodermoclysis is relatively unknown and, hence, underutilized.

Hypodermoclysis was infrequent in the present sample, with intravenous therapy used to administer medication in more than 95% of the cases. Similar proportions were reported in another study of adult palliative care patients, with 87% receiving intravenous therapy and 13% receiving hypodermoclysis during hospitalization.[17]

A scoping review described hypodermoclysis as challenging due to a lack of standardized documentation in health institutions (eg, application, dilution, recommended medications, and drug compatibility), which could result in unsafe use. Another factor that inhibits its use is a lack of information in the literature.[15]

No association ($p > 0.05$) was found between demographic variables, clinical variables, or therapy type (intravenous or hypodermoclysis) and the occurrence of the complications (phlebitis and infiltration). This result is in line with the results of other studies on intravenous therapy, ie, no significant association between phlebitis and hematoma and clinical and sociodemographic variables.[10]

The inferential analysis showed that using a multi-infusion device reduced the prevalence of infiltration by 77% ($p = 0.022$).[10] A study on hypodermoclysis investigated the relationship between 2 or more variables, but the results were inconclusive about the occurrence of complications in relation to medication class, requiring further study.[18]

The results of the present study indicate 2 complications related to intravenous therapy: phlebitis and infiltration. Another study found that complications are common in intravenous therapy and result in premature device removal and replacement.[15] A cross-sectional study[10] and a meta-analysis of 35 studies[19] on intravenous therapy found similar phlebitis rates (25.4%[10] and 31%,[19] respectively) in addition to other complications, such as a 15.9% incidence of

infiltration.[10] It has been found that the risk of phlebitis is significantly higher in women, in patients with longer catheterization time, and when the catheter was placed in the forearm.[19] In another investigation, adverse events (phlebitis and extravasation) occurred in 6 patients (7.5%).[20] In both the present and other studies, the occurrence of phlebitis exceeded the 5% rate considered acceptable by the Infusion Nurses Society.[11]

A cross-sectional study found that the most common needle gauge was 22, although the gauge was not reported in most cases.[10] This agrees with the 58.5% unidentified gauge rate in our study.

In our study, 43.8% of the puncture sites were in the cubital fossa. However, a study on intravenous therapy in patients aged > 18 years found the following prevalences: forearm (55.6%), hand (25.3%), and the antecubital fossa (15.9%), with phlebitis being the most common complication (25.4%).[10] Although no association was found with complications, the fact that the cubital fossa was the most prevalent puncture site is a point for reflection, since joint movement can be a risk factor for mechanical phlebitis.

Non-opioid analgesics and antiemetics/propulsives (dipyrone and metoclopramide, respectively) were the most prevalent intravenous medications. Opioid and non-opioid analgesics and antiemetics/propulsives were the most prevalent medications used in hypodermoclysis: morphine and dipyrone were the most commonly-used medications, followed by metoclopramide and ondansetron. In a retrospective observational study of adult inpatients who developed phlebitis during intravenous therapy, 46.1% were receiving antibiotics, 25% were receiving antiemetics, and 20% were receiving non-opioid analgesics.[21]

In agreement with our results, other studies on hypodermoclysis have found that analgesics and antibiotics are the most common classes (30% each), with the most common medications being dipyrone, morphine, ondansetron, and dexamethasone.[17] Another investigation found the most common medications used in hypodermoclysis were morphine, dipyrone, and scopolamine.[18]

A prospective observational study of patients aged ≥ 18 years in palliative care also investigated the use of opioid and non-opioid analgesics in hypodermoclysis, highlighting the importance of multidisciplinary assessment of viable access routes and planning the most suitable route for administering parenteral medications in patients with a fragile vascular network.[17]

A literature review of hypodermoclysis in older adults/palliative care patients found that it was safe and effective for controlling and relieving symptoms arising from the their chronic pathologies.[9] Corroborating these findings, a prospective observational study in palliative care patients aged >18 years who received hypodermoclysis therapy also found that this method of infusing medications and solutions was effective and viable and could be used in situations other than palliative treatment. These authors stressed that the multidisciplinary team is responsible for patient analysis and must consider possible complications in order to offer individualized and comprehensive care.[19]

Although hypodermoclysis is considered easier to apply and involves a lower risk of serious complications than intravenous therapy, it is still underused in clinical practice.[22] An observational study investigated puncture attempts for intravenous access in cancer/palliative care patients aged > 18 years, finding that the second highest rate of attempts was 6 (24%). This is significant, given that the Brazilian National Health Surveillance Agency (Anvisa) advises a limit of 2 attempts per health care professional and a maximum of 4 attempts per patient.[17] These results also show that nursing professionals opt for the intravenous route, even if it entails subjecting patients to numerous puncture attempts, which must be attributed to the relative obscurity of hypodermoclysis in the literature and in academic and professional circles.[17]

A scoping review found that hypodermoclysis is an excellent route for older and palliative care patients, since their greater weaknesses may impede intravenous access, and hypodermoclysis is a safe, simple, and effective technique with fewer limitations and a low risk of infection.[15]

In the present study, hypodermoclysis was far more infrequent (< 5%) than intravenous therapy, which should be considered a study limitation, since it did not allow further investigation into complications and related factors. The fact that all of the included patients could have received hypodermoclysis indicates a level of ignorance and, consequently, uncertainty about using the technique. This was also pointed out in a previous investigation.[23] This technique's relative obscurity may be related to a lack of discussion about it in universities, which is a challenge that must be addressed in health settings.[24]

Our findings indicate that hypodermoclysis is little used by health teams, despite a lack of related complications, which was reinforced in another study.[17] Hypodermoclysis is considered more comfortable and less painful, complex, and expensive than intravenous therapy due to the low cost of materials used in application and maintenance, in addition fewer limitations in access site, given that it can be applied away from joints.[24] Another study found that complications arising from subcutaneous therapy are local and easily resolved without systemic effects.[19]

Broader discussion about the possibilities of hypodermoclysis is needed among health professionals, resulting in new initiatives to promote and disseminate knowledge of its safety. Hypodermoclysis must be effectively incorporated into the syllabi of technical and undergraduate health courses, as well as continuing education programs at health institutions. The technique's advantages for older patients should be emphasized, given its lower complication rate, thus leading to their greater comfort and safety.

Conclusions

This study investigated the use of intravenous therapy and hypodermoclysis in hospitalized older adults, finding that intravenous therapy was far more common and that complications only occurred in intravenous therapy, including grade I and II phlebitis and grade I infiltration. Our results can help disseminate knowledge of this technique and reinforce the need for new studies on hypodermoclysis that highlight its potential for older patients.

Despite its low use in the present study, hypodermoclysis had excellent safety results and could be considered the first choice of route for hospitalized older adults. This investigation contributes to clinical practice, since the choice of medication route can affect patient safety, especially older patients with a weak vascular network.

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