

Application of early mobilization in the prevention of venous thrombosis in a hospital setting: A Systematic Review

Aplicabilidade da mobilização precoce na prevenção de Trombose Venosa Profunda em ambiente hospitalar: Uma Revisão Sistemática

Alessandra Gasparello Viviani¹, Matheus Pereira Nunes da Silva²,
Andréa Oliver Gomes³, Carolina Araujo Molina⁴

¹United Metropolitan Faculties University Center. São Paulo, São Paulo, Brazil. ORCID: 0000-0002-0122-0182. alessandragasparello@yahoo.com.br

²Corresponding author. Santa Marcelina Hospital. São Paulo, São Paulo, Brazil. ORCID: 0000-0003-1940-6636. pereira.matheus96@hotmail.com

³Santa Marcelina Hospital. São Paulo, São Paulo, Brazil. ORCID: 0000-0002-4515-3508. an_oliver@hotmail.com

⁴São Camilo University Center. São Paulo, São Paulo, Brazil. ORCID: 0000-0002-4498-4174. carolinaaraujomolina@gmail.com

RESUMO | INTRODUÇÃO: A Trombose Venosa consiste em um trombo que leva a obstrução ao fluxo sanguíneo. Desencadeada por lesão endotelial, estase sanguínea e/ou hipercoagulabilidade. Sendo que muitos dos fatores que levam ao desencadeamento destes quadros, são a imobilidade, paralisia e algumas doenças respiratórias. Portanto, a profilaxia da TVP é considerada uma intervenção eficaz e segura, mas por muitas vezes não é utilizada rotineiramente nos ambientes hospitalares. **OBJETIVO:** Verificar a utilização da mobilização precoce como profilaxia da trombose venosa profunda em ambientes hospitalares. **MÉTODO:** O estudo consiste em uma Revisão Sistemática realizada com buscas em periódicos, revistas e artigos entre o ano de 2005 a 2018 encontrados em bases de dados eletrônicos, sendo elas Pubmed, Scielo, PEDro, Lilacs, Cochrane, Medline, ResearchGate. Incluindo pacientes de ambos os gêneros com idade superior a 18 anos. **RESULTADOS:** Foram obtidos para análise 26 artigos, dos quais 14 foram excluídos por não estarem de acordo com os critérios de inclusão. Do total de 3005 pacientes, 1828 não receberam profilaxia fisioterapêutica e 1220 receberam. **CONCLUSÃO:** A mobilização precoce em ambientes hospitalares subutilizada e seus benefícios pouco conhecidos, aumentando o número de incidentes relacionados a TVP.

PALAVRAS-CHAVE: Deambulação precoce. Fisioterapia. Trombose venosa profunda. Ambiente hospitalar.

ABSTRACT | INTRODUCTION: Venous Thrombosis consists of a thrombus that leads to obstruction to blood flow. Triggered by endothelial injury, blood stasis and / or hypercoagulability. Many of the factors that trigger these conditions are immobility, paralysis and some respiratory diseases. Therefore, DVT prophylaxis is considered an effective and safe intervention, but is often not routinely used in hospital settings. **OBJECTIVE:** To verify the use of early mobilization as prophylaxis of deep vein thrombosis in hospital settings. **METHOD:** The study consists of a Systematic Review conducted with searches in journals, magazines and articles from 2005 to 2018 found in electronic databases, which are Pubmed, Scielo, PEDro, Lilacs, Cochrane, Medline, ResearchGate. Including patients of both genders over 18 years of age. **RESULTS:** Twenty-six articles were obtained for analysis, of which 14 were excluded because they did not meet the inclusion criteria. Of the 3005 patients, 1828 did not receive physical therapy prophylaxis and 1220 did. **CONCLUSION:** Early mobilization in underused hospital settings and its little known benefits, increasing the number of incidents related to DVT.

KEYWORDS: Early ambulation. Physical therapy. Deep venous thrombosis. Hospital environment.

Introduction

The term "early" refers to the concept that mobilization begins soon after the patient's physiological changes have stabilized, not after the release of mechanical ventilation or hospital discharge¹.

Early mobilization in the hospital setting aims to maintain or increase the patient's muscle strength and function, including progressive therapeutic activities such as bed mobility exercises, bedside sedestation, orthostasis, transfer, and ambulation. In addition to accelerating patient recovery, reducing the duration of mechanical ventilation and length of hospital stay².

DVT is a common disease that occurs mainly as a complication of other surgical and clinical conditions. However, it can occur spontaneously in apparently healthy people³.

DVT is known to cause serious complications such as pulmonary embolism and post thrombotic syndrome⁹. Approximately 10% of symptomatic pulmonary embolism die soon after onset, and if left untreated 30% of patients with nonfatal embolism will have a fatal recurrence. This condition is cited as one of the major causes of morbidity among hospitalized patients⁹. The most common cause of preventable deaths in hospitals may be DVT. Only clinical signs and / or symptoms, such as pain and edema in the affected limb, do not allow the proper diagnosis, which should be confirmed by Collor Doppler ultrasound⁴.

The International Consensus Statement for the prevention of embolic diseases estimates that out of 160 cases of DVT per year, 60 cases develop into fatal pulmonary embolism in a group of 100,000 inhabitants⁵.

The prevalence of DVT is likely to increase in the future, as will the age of the population, as more patients that are elderly are admitted for major surgical procedures, and many patients are discharged before they are normally walking⁶.

Studies relate DVT to the immobility of some patients in bed, and state that some hospitals, despite being adept to early mobilization protocols, do not perform periodically. Therefore, a review study on prevention methods that use early mobilization in hospital environments is necessary for the prevention of DVT^{5,6}.

The aim of this study is to verify in the literature the use of early mobilization as prophylaxis of deep vein thrombosis in hospital environments.

Study Method and Design

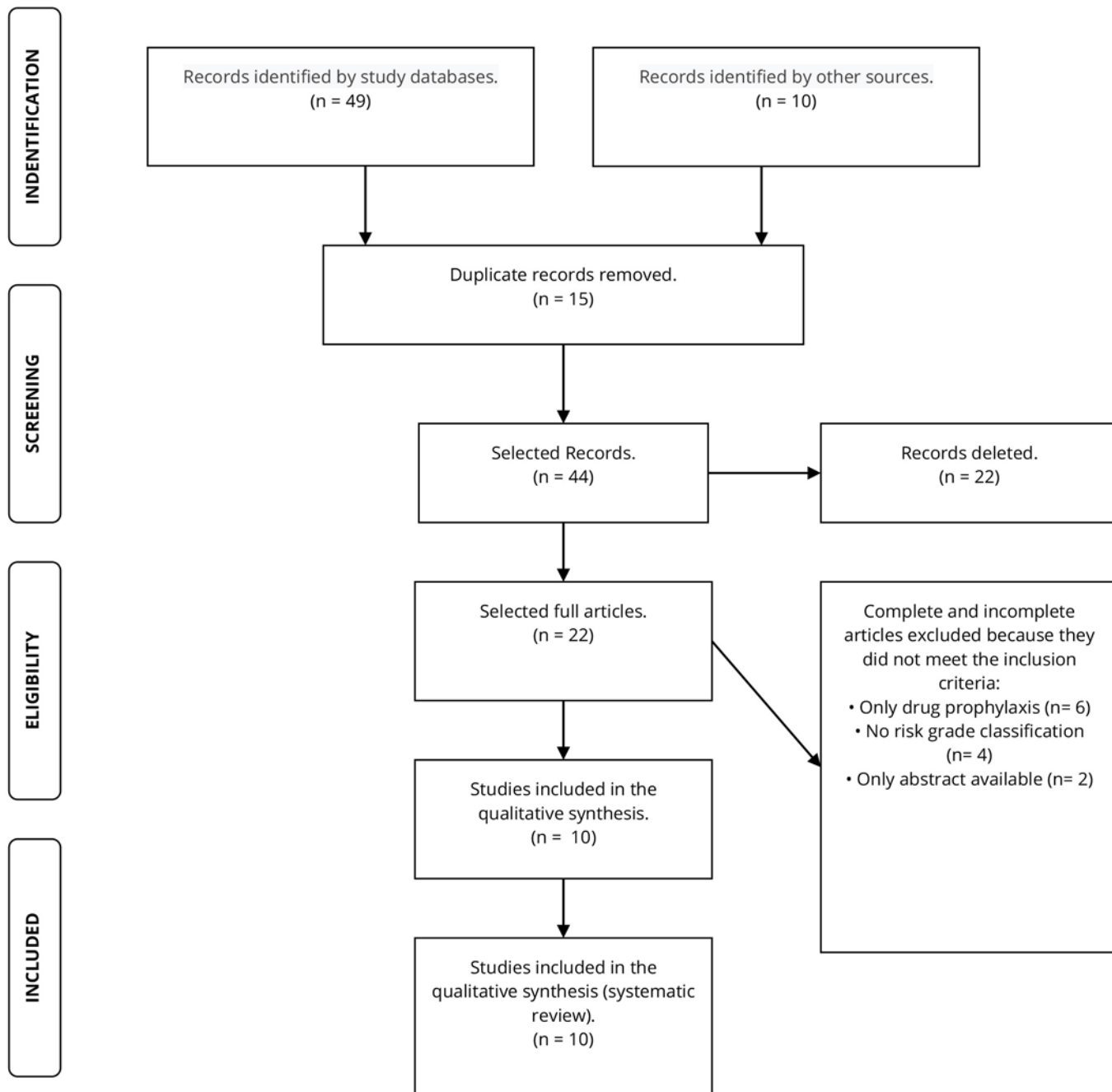
The study is characterized as a systematic review of the subject in question, with bibliographic search conducted in journals, scientific journals and articles available in electronic databases such as PubMed, Scielo, PEDro, Lilacs, Cochrane, Medline and ResearchGate, in the English and Portuguese languages. In addition, studies should include female and male participants over the age of 18 stratify groups by risk of disease, encompassing the use of early mobilization in hospital units and published over 13 years (2005 - 2018).

Therefore, the exclusion criteria were studies with inadequacy to the proposed theme, studies on the approach to drug prophylaxis excluding the mechanics or comorbidities that affect the intervention evaluation, and there is no adequate risk classification for patients at risk of acquiring the proposed disease. In this study, there are also duplicate studies, as well as theses and articles with only the abstract available.

Given this, will be researched, selected and analyzed through full reading performed by the authors of this review. Those who do not meet the selection and acceptance criteria imposed by those responsible for the study will be excluded and not introduced to the body of work, being accepted only those who meet the selection criteria already mentioned. Therefore, the data will be removed, put in digital annotation and placed directly in the work, so that summation calculations are performed to find the results.

Twenty-two articles were obtained for analysis, 12 of which were excluded because they did not meet the inclusion criteria, 6 because they only deal with drug prophylaxis, 4 because they did not classify the degree of risk of the study samples, and 2 because only the abstract. to be available. Totaling 10 researches selected for full reading, these were put into analysis by two authors who selected and collected the data necessary for this review. The process of collecting the manuscripts is completely described in Flowchart ¹.

Flowchart 1. Manuscript search strategy according to PRISMA standards



Results

The selected and analyzed articles obtained a total of 3005 patients, in which 1,751 received physical therapy prophylaxis, 1431 corresponded to low and medium risk, and 320 high / very high risk. Among these, 1,442 patients did not receive physical therapy prophylaxis. That is, 58.27% of the total patients included in this study received prophylaxis, while 48% did not receive it. Even the results of this study show that patients receiving prophylaxis are 10.27% higher than those who did not. It is evident that when compared individually, most of the studies shown in table 1 show a low and important difference between patients who underwent and did not perform the prophylaxis proposed in this review. Calling attention to the number of patients who did not practice prevention within hospital environments.

Regarding the knowledge of professionals about early mobilization in the prevention of DVT, there was agreement between the analyzed articles, reporting that most professionals do not know its benefits, or do, but do not perform it correctly.

Table 1. Using early mobilization as dvt prophylaxis in hospitals

Author/ Year of publication	Used protocol	Total number of patients	Utilization second risk degree			Total number of patients who did not use it
			Low	Medium	High/ Very High	
Garcia et al., 2005 ⁷	-	239	0	34	22	183
Lorenzoni et al., 2010 ¹⁰	Sandri M e Davison-Caprini	212	1	90	121	0
Machado et.al 2008 ¹¹	-	282	0	4	44	234
Pitta et al., 2010 ¹²	-	246	2	8	32	204
Pitta et al., 2007 ¹³	-	298	1	36	12	249
Bastos et al., 2014 ¹⁴	-	455	144	251	60	270
Santos et al., 2017 ¹⁵	-	79	1	59	19	0
Carneiro et al., 2010 ¹⁶	-	247	30	0	0	217
Cassidy et al., 2014 ²⁵	-	861		749	10	20
Silva et al., 2012 ¹⁷	-	86	16	5	0	65
Total		3005		1431	320	1442

Discussion

Patients with critical clinical status often remain at bed rest for several days or weeks, and may suffer complications such as atrophy, muscle and skeletal weakness, among other consequences associated with immobility¹. Muscle weakness is increasingly recognized in ICU patients who survive the acute phase of a critical illness. Patients may suffer repercussions for months or years after hospital discharge due to immobility, impacting the performance of daily life activities, quality of life and reintegration of the patient to society².

Early mobilization in the hospital setting aims to maintain or increase the patient's muscle strength and function, including progressive therapeutic activities such as bed mobility exercises, bedside sedestation, orthostasis, transfer, and ambulation².

Among the activities performed by the ICU physiotherapist are changes in bed position and positioning, passive mobilization, active-assisted and free active exercises, use of a cycle ergometer, electrostimulation, functional training, sedestation, orthostatism, static gait, transfer from bed to chair and ambulation¹.

There have been studies in which the most frequent type of mobilization was ambulation, along with bedside sedestation or armchair sedestation. Although mobilization percentages were different in the studies, this was not indicative of increased adverse events².

Given this fact, some articles indicate early mobilization for surgical and clinical patients at the risk of developing DVT. This practice is more approached and recommended in low risk patients^{7,17}. As for high and medium risk, the prophylaxis was exclusively medicated, whether surgical or clinical priority. Even so, in 81% of 200 patients, only 30% receive correct prophylaxis based on risk factors and clinical

indication. Since the biggest failure is in medium risk patients⁷.

By this some protocols were created and compared. As an example, the Modified Sandri and Sandri / Davison-Caprini protocols are cited, whose comparison identified that in patients of medium, high and low risk before and after surgery, early mobilization is indicated along with external resources such as pneumatic compression, elastic stockings in the anesthetic pre-induction period, until the daily ambulation stage. In addition to these strategies, pharmacological prevention is recommended only for high-risk patients¹⁰.

Some studies^{11,12,13} contradicted practices focused only on low-risk patients. Showing that 20.95% of the high-risk patients included in the study could perform some kind of mechanical prophylaxis, however the number of patients who did not receive prophylaxis was higher. While no low-risk patients and only four medium-risk patients underwent mechanical prophylaxis, demonstrating that there is a lack of knowledge about this type of prophylaxis and the classification protocols for DVT risk in some hospitals¹¹. Following the same result line, another study showed that only a small portion of patients from a wide range of risk groups performed early mobilization as a prevention for DVT, showing that only 17% of the patients included in the study had some kind of mechanical prophylaxis. being inferior when compared to the use of drugs (26%)¹², making the preventive method underused. This fact is reinforced in a study conducted in 2007¹³, in which 77% of clinical patients and 97.9% of surgical patients do not receive adequate prophylaxis according to the degree of risk, even though the effectiveness of this practice has already been proven. proven by several studies. One of them is recent and shows the importance of non-pharmacological treatment in these patients, revealing that the risk of deep vein thrombosis with non-prophylactic measures (early ambulation, physiotherapy and compressive elastic stockings)

can be halved¹⁴. In addition, studies^{11,12,13} in which all samples of various risks received early mobilization as thrombus prophylaxis obtained excellent results regarding the evolution rate to other complications using only association of active movement of the lower limbs with breathing exercises and, when possible, early ambulation. It is noteworthy that the low failure rate, only 2.5%, in a group of 79 patients who underwent mechanical prophylaxis for DVT alone¹⁵. Other studies serve to guide us in quantifying the prophylaxis performed correctly, pointing or identifying numbers of prophylaxis inappropriate conduct¹⁶. It is exposed that prophylaxis through lower limb kinesiotherapy, compression and intermittent contraction of the sural triceps to activate this muscle pump, which, when activated or compressed, promotes a decrease in venous stasis and helps increase venous return¹⁰. Coupled with the use of elastic socks that optimize venous flow, increasing up to 175% of venous flow when pressurized between 35 to 55 mmHg and early ambulation that promotes calf muscle pump stimulation, providing blood ejection, also enhancing venous return^{10,11}. And thus the risk of DVT can be reduced by up to 60% before anesthetic induction^{10,15,27}. The American College of Chest Physicians (ACCP) found in the Consensus of the Sixth Conference on Antithrombotic Therapy that many plastic surgeons do not use antithrombotic prophylaxis because they believe the incidence of DVT among hospitalized patients is very low¹⁰.

Physical therapy prophylaxis, therefore, is a safe and viable therapy that can avoid the deleterious effects of prolonged immobilization in the bed, including DVT, with positive responses in hospitalized patients⁸. But many health professionals, even though they are aware of the decrease incidence of DVT do not yet use adequate prophylaxis^{7,10,11,15}. It is noteworthy that recent studies show that the combination of pneumatic compression devices with pharmacological treatment did not show significant results compared to pharmacological treatment alone^{18,19}. However, their use in a collaborative manner with other techniques and in a multimodal manner can be considered as an effective and inexpensive way to prevent DVT in immobile patients, such as stroke or postoperative patients^{20,21,22,23}. Corroborating the practice of early mobilization in an effective way to prevent thrombosis and other adverse events in a group that has chances of acquiring DVT. As in a 2015 study²⁴

showing that ultra-early 24-hour mobilization of stroke patients may reduce the risk of acquiring deep vein thrombosis or other complications by showing that in a sample of 1048 patients, 81% experienced no serious nonfatal adverse events, 95% had no adverse events regarding severe immobility and 90% had no serious neurological adverse events. Therefore, the risk of venous thrombosis can be halved with non-pharmacological thromboprophylactic measures in patients without thromboprophylaxis²⁵.

The present study has limitations that should be considered. Despite the classifications regarding the risk of acquiring the pathology covered in this paper. The types of involvement that the samples of the obtained articles had were not classified. In addition, thromboprophylaxis was generally covered without pathological or debilitating distinction of patients included in the selected studies. Therefore, no groups were analyzed with distinction of pathology or disability, but as a whole; at the risk of getting DVT. Therefore, this study encompasses non-individualized groups with the possibility of acquiring deep vein thrombosis. It is necessary studies that have the same focus on research, but with scaling of individuals and unique groups relating them to the reason for immobility and type of involvement or affection.

Conclusion

We conclude that early mobilization in hospital settings is underused and its benefits little known, often increasing the number of incidents related to DVT.

It is noteworthy that more practical studies related to the effect of early mobilization and the frequency of its use in patients with varying degrees of risk are necessary to establish its use as treatment.

Author contributions

Viviani AG participated in the study conception, manuscript writing, research and data collection. da Silva MPN participated in the study conception, research and data collection. Gomes AO oversaw the research, and participated in the writing and critical review of the manuscript. Molina CA participated in the conception and supervision of the study and administration of the software.

Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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