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What is Known About Early Mobilisation After Cardiac Electronic Device Implant? A Scoping Review

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Background: The number of cardiac implantable electronic devices (CIEDs) implanted has been growing and the population who receive the device is older and has more comorbidities. Long bed rest and immobilisation have always been common after the implant, but a consensus does not exist on the argument.

Purpose: To map and synthesise available literature on the mobilisation approach after the implant of a CIED and which correlated outcomes exist.

Methods: A literature search was conducted in December 2023 on six databases. Screening of articles, data extraction and quality appraisal were performed by more than one author. Articles included were primary articles exploring bed rest or mobilisation after a CIED procedure. Descriptive analysis was conducted to present and synthesise the results.

Results: Of the 113 records identified, eight matched the inclusion criteria. The majority of the articles were randomised controlled trials (n = 6). Other studies were quasi-experimental (n = 1), retrospective (n = 1) and cross-sectional (n = 1). Data descriptive analysis led to the development of three main topics: (1) mobilisation modalities, (2) potential complications and (3) type of device.

Conclusions: Early mobilisation after a CIED procedure appears to be safe and not associated with other complications. A predominant barrier to early mobilisation is the lack of a consensus on the time and type of mobilisation. Early mobilisation could be applied more safely with the use of an arm support. To strengthen the evidence there is a need for more rigorous research analysing the type of device and the leads utilised.

Keywords: early ambulation, mobilisation, implantable defibrillator, pacemaker, bed rest

Introduction

In currently available literature there is no clear definition of the bed rest time requested after having implanted a cardiac implantable electronic device (CIED). Long bed rest and immobilisation are correlated with the fear of dislocation of the device, the leads and incidence of important hematoma.[1] Some studies, however, reflect on the fact that it might not be necessary to have a total bed rest after CIED implantation.[1–3] Indeed, a long immobilisation may prolong recovery, induce pain, reduce mobility, create sleep disturbance, and contribute to delirium onset, pressure ulcers and urinary retention. Nurses have a key role in screening and managing patients' discomfort or complications after post-operative adverse events.[2]

Furthermore, the prevalence of cardiac arrhythmias and high degree atrioventriculars increase in elderly patients.[3] The number of CIEDs implanted is increasing and the patients who receive the device are older and have more comorbidities.[4,5] This condition is probably correlated with the growing number of nonischemic cardiomyopathy and heart failure patients requiring primary prevention of sudden cardiac death.[6]

Hospitalisation can result in rapid functional decline, especially in older adults. One of the major causes is prolonged bed rest and immobility after an operation.[7,8]

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Therefore, in the present scoping review study we sought to investigate how early mobilisation after CIED implantation is analysed and what is the current position of the literature on the topic.

Review

CIEDs are electronic devices that are fundamental in the management of heart diseases or heart rhythm disorders.[9] One to three leads, which run transvenous to the implant in the myocardium, and the central canister, which contains the battery, generator, and all programming functions are transversal characteristics of CIED.[10]

The implanted CIED can differ based on the patient's clinical disease. They are indicated to manage slow and fast heart rates, and in the treatment of selected patients with heart failure.[11] Pacemakers can be implanted in the right atrium, the right ventricle or both (biventricular).[11] Bradycardia pacemakers are evaluated for sick sinus syndrome and type II second-degree, high-grade, and complete heart block.[9] Implantable cardioverter defibrillators (ICD) are used to prevent sudden death in patients at risk or who have had life-threatening arrhythmias.[9,11] People with chronic heart failure may benefit from cardiac resynchronisation therapy (CRT) due to weak and/or poorly coordinated ventricles and because they are at risk of sudden dysrhythmias.[10,11]

Leadless pacemakers and subcutaneous implantable cardiac defibrillators are being developed. Leadless pacemakers are correlated with less infectious risk, but they are associated with cardiac perforation risk[9,11] and they have no indications for patients with implanted vena cava filters, mechanical tricuspid valves, or implanted cardiac devices providing active therapy.[12]

During a surgical intervention nursing assistance is required. Nurses should understand indications to implant and the correlated potential complications after intervention. Nurses collaborate in patient monitoring but also education.[12]

Literature reports a lot of indications about post-operative CIED patient assistance: interrogating the device, monitoring cardiac rhythm[13] control for potential complication, hemodynamical stability, device malfunction, symptom infections[12] or distance monitoring.[14] Mobilisation is not a parameter that is always contemplated when talking about patient assistance and education with the related potential complications.

Aims

The primary aim of this scoping review was to map and synthesise available literature on the approach to mobilisation after the implant of cardiac implantable devices. The secondary aim was to identify gaps in the literature which could set the basis for future research or a change to clinical practice. This scoping review addresses two questions:

1. What is known about early mobilisation after cardiac electronic device implantation?
2. What are the gaps in the literature about mobilisation care towards people who received an implantable cardiac electronic device?

Methods

Design

A scoping review was the chosen method to examine emerging evidence; this was due to the fact that a first review of the literature had shown that the conducted studies differ a lot in methodological aspects, time of publication, outcomes and interventions. A scoping review contributes to examining the research conducted on the topic and inform future research studies.[15]

This scoping review is reported using the Preferred Reporting Items for Systematic Review and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR).[16]

The protocol for this review is not published.

Search Method

The search strategies were developed with the support and the guidance of an academic librarian. The initial stage of the search was done in Medline to identify the Medical Subject Headings (MeSH) terms and keywords related to the review aims. In order

to find all the available evidence a specific research strategy was adapted for each database interrogated, using keywords as indexed terms. With the contribution of the expert academic librarian, hand searching was performed for studies that were not retrieved in the main searches. Finally, reference lists of screened eligible articles were reviewed. The search was undertaken in December 2023 with no limitation applied to publication date. The search strategies were applied to: Medline, CINAHL, Embase, Web of science, PsycInfo, and Scopus.

Inclusion and Exclusion Criteria

Studies were considered for inclusion if eligibility criteria were matched. Peters et al[17] underline that an appropriate scoping review has to clarify the following aspects. (1) Participants were people who had received an implantable electronic cardiac device which could be a single, dual chamber or biventricular pacemaker and/or an ICD. (2) The core concept examined by the scoping review was the approach to care provision. Care is inherent on how early mobilisation is applied or intended after the device implant, and what are the time and the modalities of mobilisation during the recovery. (3) The context analysed is all the settings in which CIED procedures are performed.

Early mobilisation is intended to involve any kind of patient mobilisation after CIED implantation which avoids prolonged and obliged laying on the bed allowing the ability to stand up and mobilisation.

The inclusion criteria were applied for all studies in which the method utilised was clearly defined, the full text article was available and the language was English or Italian.

Exclusion criteria were studies which evaluated the postoperative long-term setting and mobilisation intervention without focusing on the effect of early mobilisation and bed rest duration.

Search Outcome

The main question which the scoping review intended to answer is whether early mobilisation may be a possible intervention to apply without negative outcomes after CIED intervention.

Other outcomes which the scoping review would like to understand are the time and modalities of mobilisation exploring how much literature is available and which should be the next areas of research that have to be developed and analysed.

Quality Appraisal

Quality appraisal was undertaken to answer one of the goals of this scoping review: understanding what literature is available and give information for future research. Two authors independently appraised the included articles using the JBI Critical Appraisal Tools: Checklist for Randomised Controlled Trials,[18] Checklist for quasi-experimental study,[19] Checklist for Prevalence study[20] and Checklist for analytical cross-sectional study.[21] After independent evaluations any disagreement was discussed by the two members of the team.

Data Abstraction

Three members of the research team screened the title and abstract independently. To assure the blind process Rayyan, a web and mobile app designed for reviews, was used in this selection phase. The full text articles were reviewed by two authors and any disagreement was discussed with the third.

Data of eligible studies were extracted by two authors independently following the Joanna Briggs Institute indications. Aspects included in the data extraction format were: type of study, methodology, country, setting, aim, characteristics of participants, data collection, interventions, outcomes, data analysis and key findings.

Synthesis

A descriptive results analysis is presented in order to point out the current literature on the topic.

In order to identify the existing knowledge, tables are used to present conceptual categories such as intervention type, study population, duration of intervention, aims, methodology adopted, key findings, and gaps in the research.

Results

Selection of Sources Evidence

Database searching identified 113 articles; after removing duplicates, 74 articles were screened for title and abstract. Out of these articles, nine were included for full-text review. Following a full text review five articles were included. Another five potential eligible articles were identified from full text references' analyses, from which two were excluded. A total of eight articles are included in this review. An outline of the study screening and selection process is presented in the PRISMA-ScR flow chart shown in Figure 1.[16]

Critical Appraisal of Sources of Evidence

Five randomised, controlled trials were appraised using the JBI Critical Appraisal Tools: Checklist for Randomised Controlled Trials. For most of the studies patients and assessors' blindness was not applied. As a consequence, allocation concealment was unclear for two of them.

One of the quasi-experimental studies did not have similar groups at baseline and for the other one this aspect was not applicable because it did not have a control group. For more than one aspect of the survey study, information was insufficient or unclear. No study was excluded for quality reasons.

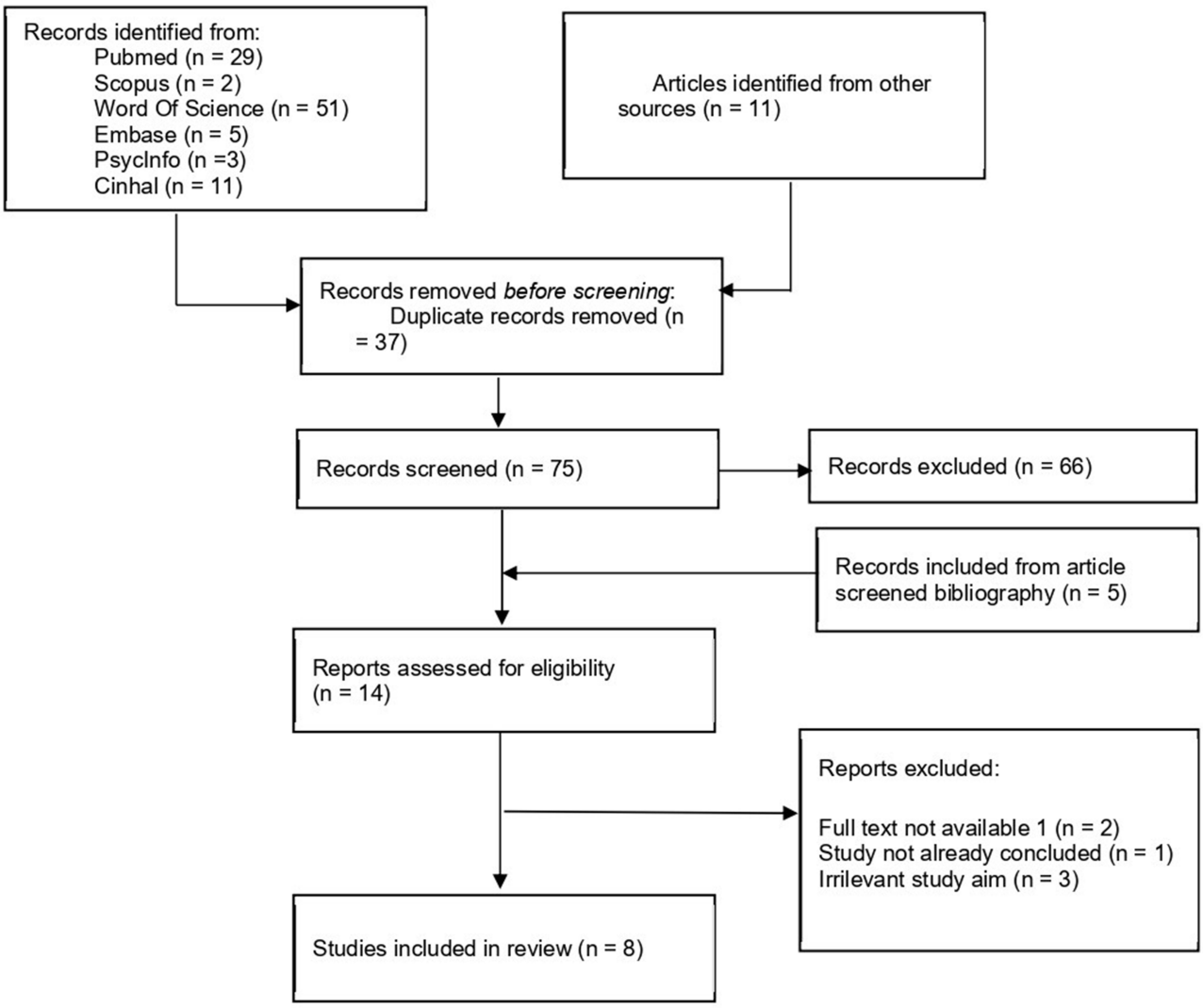

Figure 1 Flow diagram for selection of studies (PRISMA FLOW DIAGRAM).

Characteristics of Source of Evidence

General characteristics and data extraction from each article[22–29] are presented in Table 1. The majority were randomised controlled trials (n = 5), other studies were quasi-experimental (n = 1), retrospective (n = 1) and cross-sectional (n = 1). Most studies were conducted in Italy (n = 5), one in the United States, one in the United Kingdom and one in Thailand. Study participants were patients who received cardiac implantable electronic devices. Three studies included pacemaker and ICD implantation.[22–24] One study generically talks about cardiac rhythm device[25] and four other studies referred to pacemaker implantation.[24,26–29] Sample sizes of the randomised controlled studies ranged from 30 to 200 patients.[22,26–29] The retrospective studies involved 411 patients, the quasi-experimental one, 10[23] and the survey, 100 participants.[25] A total of 459 patients of the studies included received an experimental intervention, of which 219 were male with a mean age of at least more than 60 years old. A total of 1017 patients were included in the experimental or control group of the studies.

The experimental intervention analyzed by the quantitative experimental study was based on early mobilisation after pacemaker implantation. Five studies compared early mobilisation after three hours of bed rest to later mobilisation after 24 or 36 hours.[22,26,27,29] Simonelli et al[28] examined mobilisation after 24 hours instead of 48 hours. Early CIED implantation arm activity has been analyzed by Naffe et al[23] the same day and by Wongcharoen et al[24] the day after.

Table 1 Characteristics and main results of the studies considered in this review

Author	Study Type	Aim	Sample size/ Characteristics	Key Findings	Limitations
Budano et al, 2019[22]	Randomised controlled trial - Italy	To verify early mobilisation (3h) after CIED compared to 24 h immobilisation.	200 (100 in Experimental Group, 100 Control group) Characteristics: adult patients (<18 years old) with indication to CIED implantation.	No significant difference in the complication rate between standard mobilisation (24 h) and early mobilisation providing the safety and feasibility of an earlier mobilisation.	Early mobilisation has been evaluated only with a bandage support because of prudential reasons.
Collins et al, 2019[25]	Survey - United Kingdom	To determine the variation in post-implantation advice that is given to patients in cardiac rhythm device implanting centres.	100 Characteristics: healthcare workers of implanting centres in the UK.	Variation in the sources and extent of movement and mobilisation advice that is given to patients after cardiac rhythm device implantation in the UK.	The response rate is low, particularly in Scotland; arrhythmia nurses are relatively under-represented in the survey; no distinction is made between devices for defibrillation, permanent pacing and cardiac resynchronisation; no attempt was made to assess the extent to which patients adhere to the advice that is provided to them.
Miracapillo et al, 2006[26]	Randomised controlled trial - Italy	To compare mobilisation of a patient 3 h after receiving a single or dual-chamber pacemaker to 24 h immobilisation protocol.	134 (57 Experimental Group, 77 Control Group Characteristics: patients who underwent single or dualchamber pacemaker implantation.	No statistical differences resulted from the two different protocols of 3 h and 24 h of immobilisation.	Not specified.

(*Continued*)

Table 1 (Continued).

Author	Study Type	Aim	Sample size/ Characteristics	Key Findings	Limitations
Naffe et al, 2009[23]	Quasi-experimental study – United States	To test whether lead displacement would occur in patients who not only did without an immobilisation sling during the first 24 h after pacemaker/ICD implantation, but also performed a series of resistive range of motion exercise. To investigate which advice surgeons gave to patients.	10 Characteristics: adult patients with indication of pacemaker/ICD implantation.	The activity advice given to patients after pacemaker/ICD surgery was often overly restrictive and did not take into account patients' need to lift the affected arm over their head or how quickly their joint mobility might be compromised. Patients can safely perform resistive range-of-motion exercises soon after pacemaker/ICD surgery.	Small sample size.
Simonelli et al, 2018[29]	Randomised controlled trial - Italy	To verify early mobilisation (3 h) after pacemaker implantation compared to 24 h of bed rest.	30 (15 Experimental Group, 15 Control Group) Characteristics: adult patients with indication to first single or dual chamber pacemaker implantation without motion limitation because of any illnesses.	Early mobilisation after 3 h could have a positive impact on pain outcome.	The absence of blinding practices due to the visible nature of the mobility intervention; the small sample size; the loss of a proportion of subjects who were initially recruited into the study (attrition bias).
Simonelli et al, 2014[28]	Retrospective study - Italy	To verify frequency and prevalence lower back or pocket pain complications incidence between 24 or 48 h patient bed rest after pacemaker implantation.	411 (160 Experimental Group, 251 Control Group) Characteristics: adult patients (<18 years old) with indication to elective pacemaker implantation.	The reduction of mobilisation time after pacemaker implantation does not increase complications incidence.	Indirect detection of pain based on the administration of analgesics; failure to consider some variables that may affect the genesis of a hematoma; the limited number of complications.
Simonelli et al, 2012[27]	Randomised controlled trial - Italy	To verify early mobilisation (3 h) after pacemaker implantation compared to 36 h of bed rest.	32 (16 Experimental Group, 16 Control Group) Characteristics: adult patients (18–90 years old) with indication to elective single or dual chamber pacemaker implantation with an excellent independence level at the recovery moment.	Early mobilisation compared to mobilisation at 36 h from the intervention is correlated with better independence recovery. No statistical difference related to incidence complications emerged.	Small sample size.

(*Continued*)

Table 1 (Continued).

Author	Study Type	Aim	Sample size/ Characteristics	Key Findings	Limitations
Wongcharoen et al 2019[24]	Randomised controlled trial - Thailand	To assess the effect of pendulum exercise on shoulder function in patients after cardiac rhythm management devices implantation.	200 (101 Experimental Group, 99 Control Group) Characteristics: adult patients (<18 years old) undergoing transvenous ICD or permanent pacemaker implantation.	Patients can safely perform pendulum exercise soon after cardiac rhythm device implantation.	One month of follow-up is a relatively short duration.

Abbreviations: CIED, cardiac implantable electronic device; ICD, implantable cardioverter defibrillator.

Lead dislodgement was not the main outcome for all experimental studies, but it was always contemplated. Other outcomes presented were hematoma,[22,24,26,28,29] pain,[28,29] shoulder flexion range,[24] and functional independence.[27] In their survey, Collins et al[25] presented data about how many different kinds of advice were given by different specialists after cardiac rhythm devices. A similar investigation had been carried out also by Naffe et al[23] towards clinicians.

Descriptive data analysis leads to the development of three main topics: mobilisation modalities, potential complications, type of device.

As shown in Table 2, mobilisation after CIED implantation is not always the same. It can occur after 3 hours of bed rest or after 24 hours or more. The modality is not always specified. Naffe et al[23] and Wongcharoen et al[24] in the intervention groups provide arm activities, instead, Budano et al,[22] Miracapillo et al,[26] Simonelli et al[29] and Simonelli et al[27] talk about early mobilisation with a bandage or support of the ipsilateral arm. Similarly, the two-survey shows evidence that advice given to patients about inherent mobilisation are not always the same and have important differences.

Outcomes and complications identified differ between the studies, but hematoma and lead displacement are almost ever present. As shown in Table 2, the rate of complications between experimental and control group, if present, is not particularly high and does not significantly differ between the analysed groups.

Radiological monitoring is analysed by studies which included dislodgement between complications observed. Miracapillo et al[26] and Budano et al[22] evaluated chest X-rays. Wongcharoen et al[24] included X-ray monitoring at 1 day and 1 month after implantation. Simonelli et al[28] and Simonelli et al[29] specified the radiological monitoring to evaluate lead dislodgment before patient discharge. Simonelli et al[27] did not clarify radiological monitoring while Naffe et al[23] evaluated dislodgement through electrophysiology parameters.

Finally, the type of CIED taken into account can be pacemaker without specifying if it is with a single or dual chamber, an ICD or generically a cardiac rhythm device without specifying the characteristics.

The PAGER methodology was used for data analysis to establish greater methodological rigour in this review, and it is presented in Table 3.[30]

Discussion

This scoping review synthesises the approaches to early mobilisation care after a CIED elective procedure, and makes an overview of the current literature, methodological difference and gaps.

The optimal management of patient bed rest and mobilisation after a CIED procedure is an issue for which there has not been a clear consensus yet.[1]

Findings from this review add to the existing literature that interest in the argument is growing as the increasing number of studies demonstrates.

It is important to evidence that a number of unpublished studies which could add important information on the topic exist. Orlando et al[31] describe in a poster a descriptive study on the effect of immobilisation after pacemaker and ICD

Table 2 Main topic synthesis

Study	Mobilisation	Mobilisation with a support	Mobilisation comparison	Type of device	Haematoma	Displacement	Pain with drug administration	Functional independence measure/ flexion range of motion	Other complications
Randomised controlled trials									
Budano et al, 2019[22]	3 h	Yes	24 h	Pacemaker and ICD	NSD	NSD	/	/	/
Miracapillo et al, 2006[26]	3 h	/	24 h	Single or dual chamber pacemaker	NSD	NSD	/	/	/
Simonelli et al, 2012[27]	3 h	Yes	36 h	Single or dual chamber pacemaker	NSD	NSD	NSD	SD	NSD
Simonelli et al, 2018[29]	3 h	Yes	24 h	Pacemaker	NSD	NSD	SD	/	/
Wongcharoen et al, 2019[24]	With active arm exercise the day after	/	With active arm exercise after 2 weekS	Pacemaker and ICD	/	NSD	/	SD	/
Quasi-experimental study									
Naffe et al, 2009[23]	2–24 h	/	/	Pacemaker and ICD	/	NSD	/	/	/
Observational study									
Simonelli et al, 2014[28]	24 h	/	48 h	/	NSD	NSD	SD	/	/
Legend	NSD	No statistical difference		SD	Significant statistical difference in favor of intervention				

Abbreviation: ICD, implantable cardioverter defibrillator.

Table 3 PAGER structure obtained from the analysis of the selected articles

Pattern	Advances	Gaps	Evidence for practice	Recommendations
1. Bed rest amount of time after CIED implantation and early mobilisation with a bandage arm support.	Reducing the hours of bed rest time after CIED implantation may be a potential safe activity.	Despite the increased literature on the topic there is a need for more research to share the correct amount of time requested.	A reduced amount of bed rest, mostly among 3 hours, showed favourable results if associated with a bandage arm support.	Given the relevance of results it is reasonable to continue with more advanced research to understand how much early is possible to mobilise the patient and if the bandage support is always necessary.
2. Early mobilisation and correlated complications.	Studies do not evidence a statistically significant increase of complications. Rather early mobilisation may be correlated with less pain complications.	Despite the positive results not all the studies analyse the same complications or outcomes.	The results related to the association between early mobilisation and complications incidence do not reveal negative trends.	There is a need for more studies that share the type of complications analysed in support of the evidence.
3. Mobilisation advice given to patients.	The studies demonstrated a lack of consensus on the type of mobilisation advice given to patients.	The selected studies did not demonstrate a shared interest in understanding if there is a consensus on the advice given to patients.	In the context of mobilisation it is important to have a consensus on the advice given with the collaboration of all health professionals.	The evidence points to the need for additional research inherent the consensus between professionals about the mobilisation advice given, when and from whom.

Abbreviation: CIED, cardiac implantable electronic device.

implantation. Another abstract by Feldman et al[32] was focused on early mobilisation after 4 hours from implantation. Golian et al[33] published a protocol of their randomised controlled trial which will be concluded in the future on the unrestricted mobilisation of the ipsilateral arm.

A clear indication about the correct time after which mobilisation can be allowed is not given by European Society of Cardiology Guidelines[34] on cardiac pacing, implantable cardioverter defibrillator and cardiac resynchronisation therapy. However, the European Heart Rhythm Association (EHRA) position paper supports free mobilisation after a CIED procedure.[35] In practice this expert consensus is not always received and other studies to clarify the topic have been conceptualised.[2,33]

There is evidence about the long-term rehabilitation in people with pacemakers, ICDs and CRTs correlated with the benefits arising from the implant therapy.[36] Adams et al[37] evidence that the American College of Sports Medicine (ACSM) for patients who have undergone pacemaker or ICD implantation speak about traditional resistance training for 4–6 weeks but it does not talk about postoperative bed rest.

As such, It can be stated that there has not been a clear consensus on the question yet.

Immediate postoperative care is an important part of patient assistance. Nurses have a key role in screening and managing patients' discomfort or complications. Orlando et al[2] in a prospective study shows that in the first 24 hours of bed rest many adverse clinical events can occur: delirium, sleep disturbance, severe pain and urinary retention requiring catheterisation.

Simonelli et al,[27–29] have had positive results on pain incidence correlated with early mobilisation before the usual care time expected. Pain is an important aspect of patient assistance. Biocic et al[38] in their retrospective and prospective study reported that patients can reveal pain during implant procedures but also in the postoperative phase and that often a share and efficacy pain treatment does not exist.

All included studies results do not highlight negative effects of early mobilisation after CIED implantation which differ from the standard or compared care.

It is known that prolonged bed rest may prolong patient hospitalisation and contribute to complications incidence. Hospitalisation may result in rapid functional decline, especially in older adults. One of the major causes is prolonged bed rest and immobility after an operation.[7,8]

Long bed rest and immobilisation is correlated with the fear of dislocation of the device and the leads and important hematomas; however, Budano et al,[22] Miracapillo et al,[26] Naffe et al,[23] and Simonelli et al,[27–29] demonstrated that early mobilisation does not increase the risk of dislodgement at the hematoma onset.

Nevertheless, these evidences are not sufficient to give a clear and unique indication about the correct mobilisation time and modalities because of the different methodological studies approach and intervention type. It can be supposed, anyway, that early mobilisation can be expected. It is not directly correlated with adverse clinical events.

It is interesting and important to notice that the literature on the topic has been increasing over time. Still, other studies on the argument are necessary to contribute to a shared consensus.

Other aspects that the scoping review elucidates are that it may be important to understand not only early mobilisation in the imminent postoperative period but also long-term mobilisation. Collins et al[25] and Naffe et al[23] with their survey underline that the piece of advice given by team members differs in modalities but also time. Mobilisation after CIED implantation has to be evaluated also in a long-term perspective. One of the excluded studies, not pertinent with our objectives,[39] investigated the development of pathologies because of prolonged immobilisation in the shoulder on the affected side in patients with cardiac implantable electronic devices.

Future studies may correlate the lead dislodgement with the type of device and the different shapes and thicknesses. Ghani et al[40] in their prospective study demonstrated that risk of dislodgement is not the same for all types of devices. There is a difference between the type and the number of chambers in which the leads are implanted.

It should not be overlooked that studies on same-day CIED implantation discharge have already been conducted. Same-day discharge was not included in this scoping review because the aim was to investigate mobilisation. The studies included in the systematic review and meta-analysis conducted by Trongtorsak et al[41] in fact analysed same-day discharge without specifying mobilisation and bed-rest time and modalities. Future studies combining same-day discharge and mobilisation modalities could be interesting.

Another aspect that has to be considered in future studies is the development of leadless pacemaker technology. Nowadays, leadless pacemakers or subcutaneous implantable cardioverter defibrillators are not indicated in all patients and other studies are necessary to compare the short- and long-term efficacy and safety profiles of these pacing devices.[42]

Our intent was to scope the field of research on the early mobilisation after CIED implantation. The database research has demonstrated that other potential eligible unpublished studies on the topic exist. These studies could have contributed to the results precision. However, this can be a starting point for other reflections and research. Some studies included are written in Italian and this could be an obstacle to the scoping review repetition and inclusion of these studies in other research.

Conclusion

In our scoping review we found that early mobilisation after CIED implantation is a topic increasingly investigated. However, a clear consensus on the argument is not present yet and the studies included in this scoping review demonstrate that there is no statistically significant difference between early mobilisation about more bed rest time after CIED implantation. A methodology that can be used to reduce complications with early mobilisation is the use of a bandage or an arm support. Further studies are needed to support these results and to be sure of any implementation of the clinical practice. However, this evidence supports the need to clarify which is the more appropriate intervention taking into account all the clinical aspects and variability.

Data Sharing Statement

The authors confirm that the data supporting the findings of this study are available within the article.

Ethical Considerations

An ethical review was not required for this scoping review of previously published works.

Patient Consent

Patient consent was not required for this scoping review of previously published works.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

All authors approved the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The authors report no conflicts of interest in this work.

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