

R E V I E W

Nurse-led electrical external cardioversion toward patients with atrial fibrillation: a systematic review update protocol

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Abstract. *Background and aim:* Atrial fibrillation is the most frequent and prevalent increasing cardiac arrhythmia. External electrical cardioversion is the intervention frequently preferred when atrial fibrillation doesn't terminate spontaneously. Nurses, as health professionals, may have a key role in conducting the external electrical cardioversion. The aim is to understand the impact of a nurse-led elective direct current cardioversion in atrial fibrillation on patient outcomes, update the last reviews and add in the analysis educational training requested to the nurse. *Methods:* A systematic review of primary quantitative studies in English or Italian language with no temporal filter will be conducted. The search will be carried on Cochrane library, Pubmed, Cinahl, Psycinfo, Scopus, Embase and Web of science. The review will be performed using PRISMA guidelines for systematic review. *Results:* Data will be extracted independently using a data extraction format by two reviewers who will use summary of findings tables with the Grade approach to synthesize data. *Conclusions:* Conducting a systematic review on the topic, using Cochrane Library Handbook as a guide for methodological aspects, can contribute to updating the current secondary literature on the topic improving correct application on clinical practice. Implementing external elective direct cardioversion conducted by nurses requires considering effective patient potential outcomes but also professional and organisational aspects request. (www.actabiomedica.it)

Key words: atrial fibrillation, external cardioversion, advanced practice nursing

Introduction

Atrial fibrillation (AF) is the most common cardiac arrhythmia. It is generally associated with an irregular rhythm and absence of distinct P waves (1). The prevalence of this arrhythmia is associated with increasing age and it is higher in men compared to women at every age (2). The prevalence of AF is significant and increasing. The Global Burden of Disease project estimated in fact a worldwide prevalence of AF around 46.3 million individuals in 2016. In Europe, the prevalence of AF in 2010 was ≈9 million among individuals older than 55 years and is expected to reach 14 million by 2060 (2). Patients who develop an

AF, which doesn't terminate spontaneously, may undergo a cardioversion. Cardioversion can be electrical or pharmacological. For a first AF episode, electrical cardioversion is preferred in most cases to avoid drug side effects, to avoid the need for prolonged telemetry monitoring, to screen for a proarrhythmic response and to reduce the risk of some antiarrhythmic to convert AF to atrial flutter (3).

Guidelines report the importance of multidisciplinary teams in the management of AF. The European Society of Cardiology guidelines (ESC) (2020) (4) highlight that some studies have demonstrated that nurses can have an important role in AF patients' management.

Some reviews have already outlined the impact that a specialised nurse can have. The setting of care and aspects on which nurses can give a contribution together with interprofessional teams are numerous. Currie et al. in 2004, (5) reported one of the first positive experiences of nurse involvement in AF direct current cardioversion (DCCV). Rush et al. (2019) (6) synthesise and show the beneficial impact of nurse-led AF outpatient clinics. Their responsibilities could include reviewing patient history and treatments, cardioversion or education.

With another systematic review Manoj et al. (2018) (7) analysed whether a structured nurse-led elective synchronised DCCV appeared safe, effective and had a high success rate in restoring the sinus rhythm in AF. Another similar review had been already conducted by Smallwood et al. in 2005 (8). However, other current studies have been published after those two systematic reviews. It is useful to understand which kind of training and qualifications nurses have in the conducted studies. This information is necessary to eventually implement this kind of studies and practices in countries where they haven't been conducted yet.

The purpose of this study is to conduct a systematic review to update the contribution by Manoj et al. (2018) (7) and to add to current evidence discussions on nurse training and organisational or professional aspects in which care activity is implemented. The consideration of professional and organisational aspects may have an important role for future implementations.

The main questions which the systematic review intends to answer (Open Science Framework registration doi <https://doi.org/10.17605/OSF.IO/2NBCR>) considering the PICO (Population, Intervention, Comparison and Outcome) construct are:

- What is the impact of a nurse-led elective direct current cardioversion (DCCV) in atrial fibrillation on patient outcomes?
- What are the competences and the training requested to nurses?

Method

To conduct this systematic review the Cochrane Library Handbook will be our guide for the development of methodological aspects (9). All results will

Table 1. Review focus of interest and learning points.

Focus of interest	What is expected to understand
The impact of a nurse-led elective direct current cardioversion (DCCV) in atrial fibrillation on patient outcomes.	<ul style="list-style-type: none"> • Successful rate rhythm restoration. • Efficacy and safety of care with possible complications. • Organisational aspects for implementation.
The competences and the training requested to nurses.	<ul style="list-style-type: none"> • Differences between countries in training aspects.

be presented in accordance with “the PRISMA 2020 statement: an updated guideline for reporting systematic reviews” (10) (Table 1).

Primary and secondary outcomes

The primary outcome which this review intends to achieve is efficacy and safety, translated into successful cardioversion rates in the restoration of sinus rhythm following nurse-led DCCV and nurse education or training needed to execute the procedure independently.

Secondary outcomes which will be detailed, if there will be the possibility in terms of context analysis by primary studies, are patient satisfaction, cost effectiveness, waiting time but also the conditions and organisation modalities in which the procedures are performed.

Search

The search will be conducted on Cochrane Library, PubMed, Cinahl, Psycinfo, Scopus, Embase and Web of Science.

The key words which will be utilised correlated with the PICO question are presented in Table 2. On the basis of the key words identified with the collaboration of an expert informatic researcher, specific search strategies, presented in Table 3, are developed and will be utilised in different databases. Primary studies published with no temporal filter in English or Italian language will be included.

Grey literature will be evaluated through free search on the internet and by analysing references of studies.

Table 2. PICO and correlated key words to construct search strategies.

PICO		KEY WORDS	
Population	Patients with atrial fibrillation	Situation/participant	Atrial fibrillation Atrial arrhythmias Auricular fibrillation
Intervention	Nurse-led external elective cardioversion	Intervention	Cardioversion Electric countershock Electric defibrillation Electrical cardioversion Electroversion External cardioversion DC cardioversion
Comparator	Usual practice	Context	Advanced practice nursing Cardiovascular nursing Critical care nursing Cardiac nursing Coronary care nursing Nurse-led Nurse-run Nurse's role
Outcome	Health care outcomes (rate of rhythm control and complications)		

Table 3. Specific search strategies for each database.

Database	Search Strategy
Cinahl and Psycinfo	(atrial fibrillation OR auricular fibrillation OR atrial arrhythmias) AND (cardioversion OR electric countershock OR electric defibrillation OR electrical cardioversion OR electroversion OR external cardioversion OR DC cardioversion) AND (advanced practice nursing OR cardiovascular nursing OR critical care nursing OR cardiac nursing OR coronary care nursing OR nurse-led OR nurse-run OR nurse's role)
Embase	('atrial fibrillation'/exp OR 'atrial fibrillation' OR 'heart atrium arrhythmia'/exp OR 'heart atrium arrhythmia') AND ('cardioversion'/exp OR cardioversion OR 'defibrillator'/exp OR defibrillator OR 'electric shock'/exp OR 'electric shock') AND ('nurse'/exp OR nurse OR 'nurse led intervention'/exp OR 'nurse led intervention')
Web of Science	(atrial fibrillation OR auricular fibrillation OR atrial arrhythmias) AND (cardioversion OR electric countershock OR electric defibrillation OR electrical cardioversion OR external cardioversion OR DC cardioversion) AND (advanced practice nursing OR cardiovascular nursing OR critical care nursing OR cardiac nursing OR coronary care nursing OR nurse-led OR nurse-run OR nurse's role)
Cochrane Library	(atrial fibrillation OR auricular fibrillation OR atrial arrhythmias) AND (cardioversion OR electric countershock OR electric defibrillation OR electrical cardioversion OR electroversion OR external cardioversion OR DC cardioversion) AND (advanced practice nursing OR cardiovascular nursing OR critical care nursing OR cardiac nursing OR coronary care nursing OR nurse-led OR nurse-run OR nurse's role)
Scopus	(atrial fibrillation OR atrial arrhythmias) AND (cardioversion OR electroshock OR defibrillator) AND (nurse)
PubMed	(atrial fibrillation OR atrial fibrillation[mesh] OR auricular fibrillation OR atrial arrhythmias) AND (cardioversion OR electric countershock[mesh] OR electric defibrillation OR electrical cardioversion OR electroversion OR external cardioversion OR DC cardioversion) AND (advanced practice nursing[mesh] OR cardiovascular nursing[mesh] OR critical care nursing OR cardiac nursing OR coronary care nursing OR nurse-led OR nurse-run OR nurse's role)

Types of study to be included

Primary quantitative research studies (experimental, quasi-experimental and observational) will be included. The studies must clearly explain the methods used. Mixed method studies will only be considered if data from quantitative or qualitative components can be clearly extracted.

Secondary literature studies (e.g. reviews, meta-analyses, study synopses), descriptive articles that do not report data collected on a sample of subjects, case reports, case series and expert opinions shall not be included.

Inclusion criteria

- Participants: The review will consider studies that include patients with AF who have to undergo an electrical cardioversion. The electrical cardioversion will be carried on by a nurse independently.
- Intervention: This review will consider electrical cardioversion intervention conducted by a specialized nurse. It will evaluate studies including nursing electrical cardioversion in patients with atrial fibrillation in an elective regime of recovery.
- Comparison: We will consider studies with or without any kind of comparator. If absent, the comparator will be considered as the usual practice of care.
- Outcomes: We will consider studies focusing on primary and secondary outcomes reported above.

Context

This review will include studies in a clinical setting where patients with an elective regime of recovery have to undergo an electrical external cardioversion because they are affected by AF. In the clinical setting, an expert or specialised nurse primary involved in AF DCCV must be present.

Study selection and data extraction

The initial research on databases based on the search strategies identified will be conducted with the collaboration and support of an expert informatician.

The study selection will be conducted in three phases.

The first phase, the abstract and title screening, will be carried on independently by two team members supported by the use of Rayyan software to ensure the blind process (11). Therefore, as a second step, the two reviewers will actively discuss any disagreement on abstract and title screening with the involvement and collaboration of a third author in case of discordance. With the same procedure (third step) the full text of the potentially eligible studies will be analysed by two team members independently and potential disagreement would be solved by a third author. The PRISMA flow chart will be utilised to summarise the selection process (10) and to ensure the methodological rigour essential for systematic review design.

Data of studies included will be extracted using a piloted pro-forma table according to Cochrane library handbook indications:

- Authors,
- Study design,
- Type of participants,
- Setting / Region or Country,
- Characteristics of participants at the beginning of the study: age, sex and comorbidity,
- Intervention in experimental and control group,
- Type of outcomes,
- Measurement tool or instrument,
- Method of aggregation,
- Number of participants,
- Number of participants who withdrew, were lost or excluded,
- Complications,
- Summary data for each group,
- Estimates of the effect of intervention (risk ratio, odds ratio, mean difference),
- Nursing education or expertise,
- Key conclusions referring to each outcome of interest.

Any variations to these items or other relevant aspects for results presentation and analysis will be evaluated for inclusion in the data extraction format during the studies' integral analysis.

Risk of bias assessment

All included studies will be assessed using the Risk of Bias tool (Rob 2) for randomized controlled trials (9) and Robins-I tool for non-randomized studies (12). Evaluation will be carried on by two independent reviewers. A third team member will be involved to discuss discrepancies.

Strategies for data synthesis

At least one summary of findings table will be developed based on Cochrane handbook indications reporting outcomes correlated with the relative burden and effect. The Grade assessment will be utilised for the overall certainty of the body of evidence for each outcome (13).

The final decision about the strategies for data synthesis and relative presentation will be made based on data revealed from the research process.

Results will be interpreted and discussed considering a broad international perspective analysing different aspects, taking into account that derived information can be useful for different countries and setting of care.

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Ethical considerations: Ethical review was not required for this systematic review of previously published works.

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

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

Authors' contribution: DaC, PF and SR participated in the study's conception, methodology and design. DaC and PF contributed to

the writing of the current manuscript. DaC, PF, SR and Doc collaborated to the reviewing and editing of the current paper. DaC, PF and DoC will contribute to the acquisition and selection of studies. DaC, PF, SR and Doc will participate in the analysis, data curation of the evidence. DaC and PF will coordinate and supervise the planning and validity of the research activities.

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