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Review

The recovery position for maintenance of adequate ventilation and the prevention of cardiac arrest: A systematic review

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Abstract

Aim: To conduct a systematic review of the use of the recovery position in adults and children with non-traumatic decreased levels of responsiveness changes outcomes in comparison with other positioning strategies.

Methods: We searched Medline (Ovid), Embase, Cochrane Library, CINAHL, medRxiv and Google Scholar from inception to 15 March 2021 for studies involving adults and children in an out-of-hospital, first aid setting who had reduced levels of responsiveness of non-traumatic aetiology but did not require resuscitative interventions. We used the ROBINS-I tool to assess risk of bias and GRADE methodology to determine the certainty of evidence.

Results: Of 17,947 citations retrieved, three prospective observational studies and four case series were included. The prone and semi-recumbent positions were associated with a decreased rate of suspected aspiration pneumonia in acute poisoning. Use of the recovery position in paediatric patients with decreased levels of responsiveness was associated with a deceased admission rate and the prone position was the position most commonly associated with sudden unexpected death in epilepsy. High risk of bias, imprecision and indirectness of evidence limited our ability to perform pooled analyses.

Conclusion: We identified a limited number of observational studies and case series comparing outcomes following use of the recovery position with outcomes when other patient positions were used. There was limited evidence to support or revise existing first aid guidance; however, greater emphasis on the initial assessment of responsiveness and need for CPR, as well as the detection and management of patient deterioration of a person identified with decreased responsiveness, is recommended.

Keywords: Recovery position, Lateral positioning, Cardiac arrest, Systematic review, Resuscitation, First aid, Ventilation

Introduction

The recovery position, (semi-prone; lateral recumbent; side-lying; three-quarters prone positions), are widely recommended for persons with a decreased level of responsiveness[1–3] of varied aetiology. Conditions that the recovery position (including lateral and prone variants) may be employed for include heat stroke,[4] opioid toxicity,[5] COVID19 respiratory failure[6] and post-cardiac arrest return of spontaneous circulation.[7] The logic of the recovery position is to reduce the risk or effect of airway obstruction, facilitate drainage of the airway, reduce the risk of aspiration, reduce chest pressure that could impair breathing, limit neck movement, allow for observation of breathing, and be of low risk to the subject, while being easy to return the subject to a supine position if required.[8] In a multiple casualty setting with limited numbers of rescuers, use of the recovery position also allows a rescuer to leave the side of a person with diminished responsiveness, but without need for CPR, to attend to other casualties.

A decreased level of responsiveness represents an abnormal rousability and depressed alertness, on a continuum from sleepiness (somnolence) to unresponsive (coma). For example, a person may respond to verbal or mechanical stimulation but quickly return to an unresponsive state when unstimulated. Importantly, the recovery position should not be employed for a person who is in cardiac arrest,

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that is unresponsive and breathing abnormally (gasping or agonal breathing), or not breathing at all (apnoea).[9,10] Instead, cardiopulmonary resuscitation and application of an automated external defibrillator (AED) are indicated.[11] Therefore, it is necessary to initially assess and continuously monitor the subject for deterioration and indications for resuscitative interventions.

The strength and certainty of scientific evidence supporting the use of the recovery position, and agreement on which specific position is best, is very limited. A 2015 ILCOR Consensus on Science on this topic concluded that first aid providers should position unresponsive persons who are breathing adequately into a recovery position as opposed to leaving them supine, but this was a weak recommendation from very low certainty evidence.[12] Furthermore, it was not possible to identify an optimal recovery position.[12,13] A 2019 ILCOR scoping review and Consensus on Science on this topic described a diverse knowledge base on the role of positioning in airway patency and the maintenance of breathing, as well as numerous gaps in understanding.[14] Therefore, we conducted a systematic review of the use of the recovery position in adults and children with non-traumatic decreased levels of responsiveness compared with other patient positioning strategies, with the objective of informing future guidelines.

Methods

The review was undertaken by the International Liaison Committee on Resuscitation (ILCOR) First Aid and Basic Life Support Task Forces, and was based on a PICOST question (Population, Intervention, Comparator, Outcome, Study Designs and Timeframe) approved by the ILCOR Scientific Advisory Committee (SAC). It was guided by Preferred Reporting Items for Systematic reviews (PRISMA) with the meta-analyses extension for systematic reviews[15] and the Synthesis without meta-analysis (SWiM) in systematic reviews reporting guidelines. See supplemental material for definitions and reporting checklists.[16]

Protocol and registration

The review was prospectively registered on 28 April 2021 (PROSPERO registration number CRD42021248358).[17] Our search strategy, including conceptualisation and the terms used, was predefined and developed by an information specialist (see supplemental material). Relevant outcomes were prioritised by the ILCOR First Aid Task Force and based on the available literature and task force expert judgement. Deviations from our PROSPERO registered protocol are detailed in the supplemental material accompanying this article.

Information sources and search strategy

The search was conducted between 28 May 2021 and 17 November 2021, then updated on March 15 2022 using the databases of Medline (Ovid), Embase, Cochrane Library, CINAHL, medRxiv and Google Scholar were used from their dates of inception. Clinicaltrials.gov and PROSPERO were searched for other ongoing or completed studies. All years and languages were included as long as there was an English abstract.

Study selection

Inclusion

Studies of participants of all ages were eligible for inclusion provided they related to, or could be applied to, a first aid setting. For the purposes of this review, the first aid context was conceptualised as immediate medical assistance, with assistance provided prior to professional medical help, often by persons with limited training (see Table 1). Randomized controlled trials and non-randomized studies, interrupted time series, controlled before-and-after studies and cohort studies were be eligible for inclusion. Case series and case reports of five or more cases were considered for inclusion.

Exclusions

Conference abstracts, protocols without a subsequently published paper, studies that only had an abstract, and papers without an English abstract were excluded. Studies of patients with a decreased level of responsiveness resulting from trauma, anaesthesia or sleep were excluded. Studies of healthy volunteers, animals, and cadaveric models were excluded as were simulation studies.

Four reviewers (DOD, CP, EM, MJD) used pre-defined criteria independently to screen titles and abstracts retrieved by the systematic search. Any disagreements regarding inclusion or exclusion were resolved by discussion between the reviewers and with two additional reviewers (JR, AO). Kappa values for inter-reviewer variance were calculated. At least two reviewers independently reviewed the full-text reports of all potentially relevant publications. Any disagreement regarding eligibility was resolved by consensus.

Data collection

Reviewers (JR, EM, MJD) used a pre-defined, standardised data form to extract data from individual studies. Any discrepancies in the extracted data were identified and resolved by discussion and consensus. Prespecified outcomes of interest included survival, delayed detection of apnoea and cardiac arrest, need for airway manoeuvres, incidence of aspiration and any complications.

Risk of bias in individual studies

Reviewers (MJD, EM) assessed risk of bias using the ROBINS-I tool for observational studies[18] and a previously adapted tool form to assess the risk of bais of case series and reports.[19,20] These tools assessed risk of bias due to confounding, selection, classification of interventions, protocol deviations, missing data, measurement, and reporting. Potential sources of bias in case series were assessed using four domains: selection, ascertainment, causality, and reporting.[19] Disagreements were resolved by discussion and consensus. See supplemental material for detailed risk of bias assessment.

Data synthesis and confidence in cumulative evidence

From the ILCOR First Aid Task Force's discussion of the evidence, it was determined that the risk of bias in the available evidence, consisting primarily of case reports and observational studies of disparate outcomes, would preclude meta-analysis. A narrative synthesis was therefore planned to inform future guidelines development.

Table 1 – PICOST Question.

Population	Adults and children in the first aid setting, with a reduced level of responsiveness of non-traumatic aetiology, who do not require resuscitative interventions
Intervention	Specific positioning (recovery position including various semi-prone, lateral recumbent, side-lying, or three-quarters prone positions of the body).
Comparator	Compared with supine or other proposed position
Outcomes	Any relevant clinical outcomes including but not limited to: Critical: survival incidence of cardiac arrest delayed detection of apnoea and cardiac arrest Important: need for airway management incidence of aspiration hypoxia likelihood of cervical spine injury complications (venous occlusion, arterial insufficiency, arm discomfort/pain, discomfort/pain, aspiration pneumonia)
Study designs	Randomised controlled trials (RCTs) and non-randomised studies (non-randomised controlled trials, interrupted time series, controlled before-and-after studies, cohort studies) and case series. Reports including a minimum of five cases were eligible for inclusion. Animal, healthy volunteer, and cadaver research was ineligible for inclusion. Unpublished studies (conference abstracts, trial protocols) and editorials were excluded, although case reports published in letter form were included. Scoping reviews and systematic reviews were included for discussion and to assure no primary papers were missed, but data were not extracted from these reviews.
Timeframe	All years and all languages were included as long as there was an English abstract. The literature search was updated to 17 November 2021 and updated March 15th 2022.

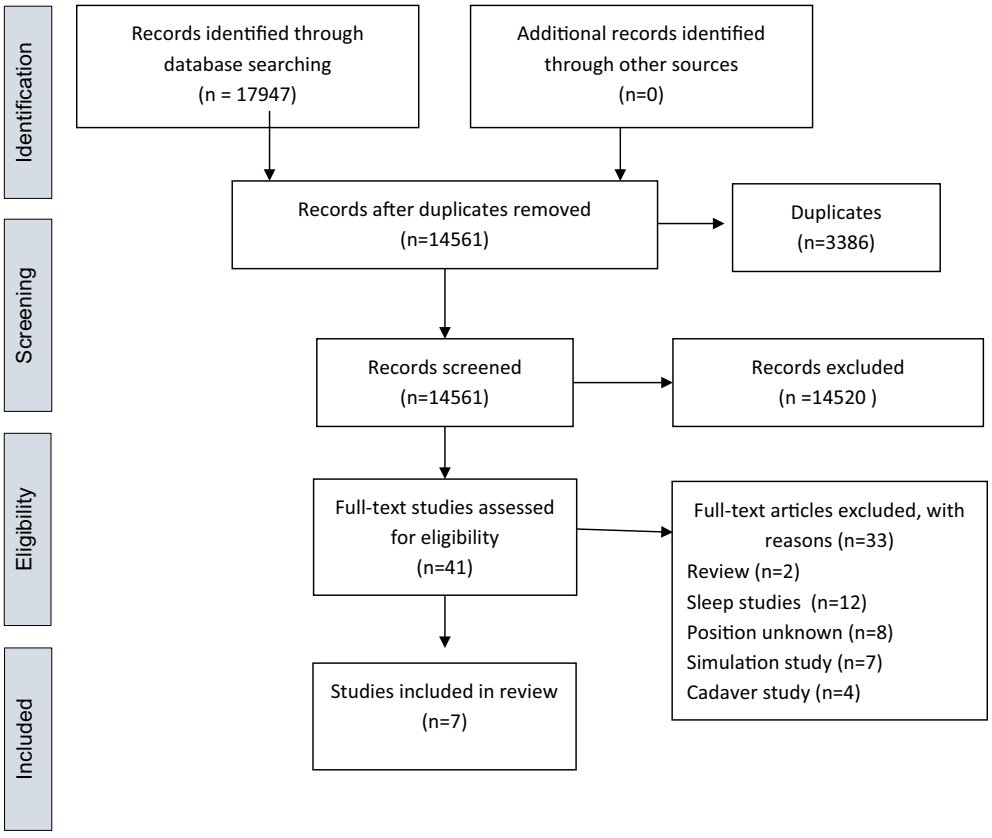

Fig. 1 – PRISMA 2009 Flow Diagram.

Results

Our search retrieved 17,947 unique studies (see Fig. 1). Title and abstract screening resulted in a Kappa of 0.76. Forty-one articles underwent full-text screening and nine were included (Kappa for full text review = 0.82). No studies were located in preprint, reference lists of included articles, or by Google Scholar forward citation searching that were not identified through searching the databases.

In total, 3 prospective observational studies ($n = 1003$)[21–23] and 4 case series ($n = 251$)[24–27] were included. The most common exclusions were: sleep studies ($n = 12$); studies in which it was not possible to determine patient position ($n = 8$); and simulation studies with healthy volunteers ($n = 7$). The papers included were published over a 24-year period (1996–2020) and were conducted in 6 different countries (France, Germany, Norway, Spain, UK, and USA (2 studies), as well as one multinational European and one multinational, multi-continent study.

Observational studies

The observational studies included a total of 450 adults and 553 children who had sustained poisoning, febrile seizures, non-febrile seizures, vasovagal symptoms, or out-of-hospital cardiac arrest that had resulted in activation of emergency medical services (see Table 2).[21–23]

In an observational, descriptive study of body position in 205 acutely poisoned adult patients aged < 65 years with suspected aspiration pneumonia (on admission x-ray within 24 hours of admission as read by blinded intensive care staff physicians), 112 patients (54%) were found supine, 30 (15%) left lateral decubitus, 25 (12%) prone, 20 (10%) right lateral decubitus, and 18 (9%) in a semi-recumbent position.[21] The prone and semi-recumbent positions were associated with a decreased rate of suspected aspiration pneumonia ($p < 0.001$), whereas there was no significant difference between left lateral decubitus, right lateral decubitus, and supine groups with respect to the incidence of pulmonary infiltrates.[21] Patient body position was recorded by the responding prehospital care personnel at the time of their arrival. If the body position had been shifted to lateral decubitus by a Basic Life Support team prior to the arrival of the Advanced Life Support medical team, the patient was excluded from the study. Likewise, if the aspiration was observed during prehospital intubation or during transportation, the patient was excluded.

Julliand et al. performed a prospective, observational multicentre study of consecutive children consulting for decreased level of consciousness by questionnaire to explore causes of decreased level of consciousness and to describe the manoeuvres performed by caregivers. The questionnaires were administered face to face by the attending physician and caregivers present at the emergency department were interviewed.

Use of the recovery position in 145 of 553 (26.2%) paediatric patients with decreased levels of responsiveness, cared for at European emergency departments, was associated with a deceased admission rate (adjusted odds ratio of 0.28; 95% CI 0.17–0.48, $p < 0.0001$).[22]

In a prospective, observational study of 200 adult cases of out-of-hospital cardiac arrest the prehospital physician collected structured information from the first responders such as the actions of bystanders and chest compression quality, semi-structured interviews with the witnesses of the collapse were also performed.[23] In cases of out-of-hospital cardiac arrest attended by bystanders, only 64 (32%) patients were found by the emergency services to have been placed in a supine position suitable for the performance of chest compressions.[23] Of the remainder, 37 (18.5%) were found to be in the recovery position, which was more likely to have been the case if bystanders had recently attended a CPR course. Although there was no statistically significant difference in favourable neurological outcome between patients placed in the recovery position compared with those placed in a position suitable for chest compression ($p > 0.05$), it was suggested that knowledge of the recovery position might distract bystanders from performing CPR.[23] Positioning of the the victim differed according to the basic life support training status of lay bystanders: 5 victims (18.5%) were placed in the recovery position by bystanders without training, 12 victims (22.2%) by bystanders who had attended a course over 5 years prior, 8 victims (34.8%) by bystanders who attended training within 5 years.

Case series and case reports

Three included case series ($n = 244$) described the position of persons with sudden unexpected death in epilepsy.[25–27] One case series, in the form of a research letter, identified seven cases believed to be missed out-of-hospital cardiac arrest due to the use of the "recovery position" (see Table 3).[24]

A retrospective analysis of deaths in an outpatient population of a tertiary referral centre identified 140 patients with epilepsy who died between 1965 and 1996, of which 42 patients experienced sudden unexpected death in epilepsy (26 male, 16 female, mean age at death 27.9 years, standard deviation 15.7 years).[25] Of the 24 patient whose position at death was known, 17 (71%) were in the prone position, 1 was supine position (4%) and 6 (25%) were in unclassified positions (other demographics such as sex and age not reported). When an equal likelihood of prone or other positioning is assumed, the difference (71% prone) versus (29% all other positions) was found to be statistically significant (p = 0.001; two tailed test).[25]

In a systematic, retrospective survey of international epilepsy monitoring units, 29 cardiorespiratory arrests were reported by 27 units from 11 countries.[26] Among the 16 sudden unexpected deaths in epilepsy and fatal near-sudden unexpected deaths in epilepsy in which the position of the patient could be assessed (additional demographics such as age and sex not reported), 14 were prone at the time of cardiorespiratory arrest, often with the face partly tilted to one side.[26]

A retrospective review, including death scene investigation, autopsy and next-of-kin interviews identified 237 definite and probable cases of sudden unexpected death in epilepsy.[27] The median age of the 237 cases was 26 years (range 1–70 years) and 385 ($n = 89$) were female. The majority (128/186, 69%) were found in the prone position ($p < 0.05$).[27]

The case series, in the form of a letter to the editor, superficially described the experience of an emergency medical services organization in Lugo, Spain that report seven out-of-hospital cardiac arrest victims who were initially placed into the recovery position by bystanders because they were evaluated as unresponsive and breathing normally.[24] However on assessment by the professional responders, the seven victims were found to be in cardiac arrest, which the authors believe went undetected due to the use of the recovery position.

Table 2 – Observational studies of positioning on persons with decreased level of consciousness due to non-traumatic etiology.

Author, year	Design, Country	Population, Sample and Etiology	Position	Outcomes
Adnet et al. 1999	Observational descriptive study of body position and suspected aspiration pneumonia in acutely poisoned patients. Paris, France	205 consecutively enrolled patients in an intensive care unit, presenting acutely poisoned and comatose.	Body positions of the poisoned patients were classified as prone (PP), supine (SP), left lateral decubitus (LLD), right lateral decubitus (RLD) or semi-recumbent (SR). Suspected aspiration pneumonia determined by chest radiograph.	One hundred twelve patients (54%) were included in the supine group, 30 (15%) in the left lateral decubitus group, 25 (12%) in the prone group, 20 (10%) in the right lateral decubitus group, and 18 (9%) in the semi-recumbent group. The prone position and semi-recumbent position were associated with a significantly decreased rate of suspected aspiration pneumonia. There was no significant difference between left lateral decubitus, right lateral decubitus, and supine groups with respect to the incidence of pulmonary infiltrates. The lateral decubitus position does not appear to protect against aspiration pneumonia in poisoned patients when compared with other body positions. Moreover, the prone position is least often associated with subsequent radiographic findings of suspected aspiration in this series.
Julliand et al. 2016	Prospective observational multicentre cohort study 11 paediatric emergency departments in 6 European countries Spain, France, Italy, Luxembourg, Belgium, and Switzerland	Children (age 8–18 years) with loss of consciousness defined as "an interruption of consciousness without response to stimulation, regardless of the length of interruption" (n = 553) 191 patients were < 2 years (34.5%), 109 patients had chronic disease (19.7%) and 243 had a history of loss of consciousness (43.9%). Two most common aetiologies were vasovagal syncope in 124 patients (22.4%) and seizures in 162 patients (29.3%).	Parents put patients in the recovery position in 145 (26.2%) cases.	Independent association between the recovery position and a decreased admission rate with an adjusted OR of 0.28 (95% CI 0.17–0.48, $p < 0.0001$). Recovery position was associated with a decreased admission rate when a longer hospitalisation was considered as the outcome (conventional or pediatric intensive care unit (PICU) hospitalisation vs direct discharge from the pediatric emergency department (PED) or admission in a short-stay observational unit): an OR = 0.43 (95% CI 0.21–0.88, p = 0.02). No statistical interaction between the recovery position and patient age.

(*continued on next page*)

Table 2 (continued)

Author, year	Design, Country	Population, Sample and Etiology	Position	Outcomes
Wagner et al. 2020	Prospective observational study of patient positions suitable for chest compressions at the time of out of hospital cardiac arrest (OHCA) response Berlin, Germany	200 non-traumatic out of hospital cardiac arrest calls to emergency medical services (EMS), 135 (67.5%) were witnessed arrest, 43 (21.5%) were unwitnessed, and remained undetermined. Median age of male patients was 68 (25th–75th percentiles: 58–76) and 80.5 (68–85) for females. The incidence of initial ventricular fibrillation/ventricular tachycardia was 40.3%; 73.9% of 199 arrests occurred at home.	Victim position at the time of emergency medical services (EMS) arrival was: 64 (32%) supine on firm surface, 136 (68%) were in a position not suitable for chest compression, 37 (18.5%) were in the recovery position and 99 (49.5%) were in a non-recovery position unsuitable for chest compressions (CC).	Victims in supine position had higher favourable neurological outcome at 3-months compared with positions unsuitable for chest compressions (17.2% vs 8.1%). The differences in favourable neurological outcomes of victims who had been placed in the recovery position (RP) compared to positions suitable for chest compression were not statistically significant.

Abbreviations list: PP – Prone Position, SP – Supine Position, LLD – Left Lateral Decubitus, RLD – Right Lateral Decubitus, SR – Semi-Recumbent, PICU – Pediatric Intensive Care Unit, PED – Pediatric Emergency Department, EMS – Emergency Medical Services, OHCA – Out of Hospital Cardiac Arrest, SUDEP – Sudden Unexpected Death in Epilepsy, ED – Emergency Department, SIDS- Sudden Infant Death Syndrome, CC – Chest Compression, RP – Recovery Position.

Risk of bias

Certainty of evidence was assessed as low and very low for included observational studies due to risk of bias, indirectness, and imprecision. All case series and reports were considered at critical risk of bias primarily due to incompleteness of reported data. See supplemental material for bias assessment.

Discussion

In this systematic review of the recovery position for persons with a decreased level of responsiveness from non-traumatic aetiology, a limited number of suitable observational studies and case series or reports were identified. The lack of comparative studies examining outcomes of interest (such as delayed detection of apnoea and cardiac arrest, the need for airway maneuvers and complications) precluded comparisons or meta-analyses. Furthermore, the lack of high-certainty comparative studies that support (or oppose) the use of the recovery position, also limited the study. We found inadequate evidence to recommend changes to existing resuscitation and first aid guidelines.

Authors have expressed concern (and provided evidence from healthy volunteers simulating apnoea using breath-holding) that placing individuals in the recovery position may impair the detection of cardiac arrest and that supine positioning with a head-tilt-chin-lift should be adopted instead.[28,29] However, it remains unknown how well the head-tilt-chin-lift is performed or whether it can be maintained for prolonged periods by first aid providers, and lay persons; moreover, it cannot be maintained in mass casualty situations. We do, however, recommend that training in first aid and CPR should place more emphasis on the assessment of responsiveness, and the need for CPR, as well as monitoring for and management of patient deterioration. Observation of the subject may be more complete when they are supine, but a patent airway and unencumbered breathing may be easier to maintain in the recovery position. This is supported by the studies showing that recovery positioning in sleeping adults as well as sedated children has been reported to reduce apnoea, airway obstruction, and respiratory disturbance compared with the supine position.[30–34]

The aetiology of the decrease in level of responsiveness may also have a role in the position selected. For example, decreased responsiveness in a person with copious oropharyngeal secretions or obesity and obstructive physiology may require recovery positioning, whereas a person in cardiogenic shock and imminent cardiac arrest may benefit from a supine or recumbent position to aid in monitoring and the recognition of deterioration. Regardless of the aetiology, repeated assessments of airway patency and adequacy of breathing are required.

Additional studies that include comparative interventions, larger observational studies or case series representing the total experience of a first aid setting such as overdose prevention services or 911 call-taker instructions for bystanders would help address the knowledge gap. Careful analysis of subgroups with decreased responsiveness should be explored to help identify patient types who may be helped and harmed by different positions.

Limitations

This systematic review has several limitations. The lack of randomised controlled studies limits the ability to definitively compare

Table 3 – Case series of positioning on persons with decreased level of consciousness due to non-traumatic etiology.

Author, year	Design, Country	Population, Sample and Etiology	Position	Outcomes
Freire-Tellado et al. 2016	Case Series (letter to the editor) Lugo, Spain	During 2013 and 2014 emergency medical services responded to seven out of hospital cardiac arrest victims who were assessed as unresponsive and breathing prior to being placed in the recovery position.	Supine of flat. firm surface; position not suitable for chest compressions, recovery position; nonrecovery position not suitable for chest compressions.	7 cases of missed out of hospital cardiac arrest are reported.
Kloster et al. 1999	Retrospective analysis of deaths in an outpatient population of a tertiary referral centre, based on clinical and pathological data Oslo, Norway	140 patients with epilepsy who died between 1965 and 1996. 42 patients with sudden unexpected death in epilepsy (SUDEP).	"Prone position" as defined as lying on the belly, chest, or face, with or without obstruction of the nose or mouth. "Supine position" as defined as lying on the back, with no obstruction of the nose or mouth.	Prone position 17 (71%); Supine position 1 (4%); Other position 6 (25%) Considering only those with a verified position, 71% were lying prone, 4% supine, and 25% in other positions. Assuming an equal likelihood of either the prone or the supine positions, this difference was significant ($p = 0.001$; two tailed test)
Ryvlin et al 2013	Systematic retrospective survey of epilepsy monitoring units Europe, Israel, Australia, and New Zealand	29 cardiorespiratory arrests were reported by 27 units from 11 countries.		Among the 16 sudden unexpected death in epilepsy and fatal near sudden unexpected death in epilepsy cases in which the position of the patient could be assessed, 14 were prone at the time of cardiorespiratory arrest, often with the face partly tilted to one side.
Verducci et al. 2019	Retrospective medical record, death scene investigation, autopsy and next of kin interviews New York, USA	237 definite and probable cases of sudden unexpected death in epilepsy were identified, median age 26 (range 1–70) and 38% female.	Found in the prone position versus all other positions.	128/186 (69%) persons with sudden unexpected death in epilepsy were found in the prone position.

Abbreviations list: PP – Prone Position, SP – Supine Position, LLD – Left Lateral Decubitus, RLD – Right Lateral Decubitus, SR – Semi-Recumbent, PICU – Pediatric Intensive Care Unit, PED – Pediatric Emergency Department, EMS – Emergency Medical Services, OHCA – Out of Hospital Cardiac Arrest, SUDEP – Sudden Unexpected Death in Epilepsy, ED – Emergency Department, SIDS- Sudden Infant Death Syndrome, CC – Chest Compression, RP – Recovery Position.

the efficacy of any one position compared with another. In addition, the significant risk of bias from the observational studies limited our ability to perform meta-analyses. The Kappa scores obtained by our screening, denoting a moderate to strong level of agreement,[35] are likely due to the diverse nature of the studies returned by our search, not identified in early piloting of our search strategy.

Public feedback through the International Lisison Committee on Resuscitation Consensus on Science with Treatment Recommendations (CoSTR) website (www.costr.ilcor.org) elicited valuable clarifications and critiques of our work. One query we received was whether an unconscious person was ever completely face down. We found literature that described a hip-flexed and neck-flexed position asphyxia position associated with opioid toxicity,[36] which necessitates repositioning of the airway to allow for assessment of airway patency and breathing. Another comment questioned the decision to structure our search to include persons with decreased responsiveness and not decreased consciousness. As this was a first aid review, and first aid interventions are provided predominantly by lay-persons, we chose the simpler concept i.e. the reactivity or response to stimuli, not consciousness which could be misconstrued as perception or awareness.

Conclusions

We identified a limited number of observational studies and case reports comparing the positioning of patients with decreased levels of responsiveness of non-traumatic aetiology. There is limited evidence to support or revise existing first aid guidance. The recovery position remains a reasonable option when attention is paid to monitoring for and responding to patient deterioration. In circumstances where the recovery position prevents or interferes with the rescuer's ability to assess for signs of life, it is reasonable to return the patient to the supine position and employ manual airway manoeuvres.

ILCOR statement

This review includes information on resuscitation questions developed through the continuous evidence evaluation process, managed by the ILCOR. The questions were developed by ILCOR Task Forces using strict conflict of interest guidelines. In general, each question was assigned to two experts to complete a detailed structured review of the literature and complete a detailed evidence evaluation. Evidence evaluations are discussed at ILCOR meetings to reach consensus and produce a final summary document.

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CRediT authorship contribution statement

Matthew J. Douma: Conceptualization, Methodology, Writing – review & editing, Project administration. **Anthony J. Handley:** Review & editing. **Ella MacKenzie:** . **James Raitt:** Methodology. **Aaron Orkin:** Methodology. **David Berry:** Writing – review & editing. **Jason Bendall:** Writing – review & editing. **Domhnall O'Dochartaigh:** . **Christopher Picard:** . **Jestin N Carlson:** Supervision. **Therese Djärv:** Supervision. **David A. Zideman:** Supervision. **Eunice M. Singletary:** Supervision, Review & editing.

Declaration of Competing Interest

The ILCOR Continuous Evidence Evaluation process is guided by a rigorous ILCOR Conflict of Interest policy. No Task Force members nor other authors were recused from the discussion due to a declared a conflict of interest.

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Appendix A. Supplementary data

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