



UTIC | **ANMCO**
CLUB |
CRITICAL CARE COMMUNITY

LA MOBILIZZAZIONE DEL PAZIENTE RICOVERATO IN TERAPIA INTENSIVA CARDIOLOGICA

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S.C CARDIOLOGIA/UTIC - A.O. S. Croce e Carle Cuneo

Vantaggi della mobilizzazione precoce

The effect of early mobilization in critically ill patients: A meta-analysis

Kui Zang |
Shiguang Gu

Results: Five meta-analyses showed a reduction in the incidence of ventilator-associated pneumonia (WMD = -1.82 days, 95% CI: -3.12, -0.52; P < .001) stay of hospital (WMD = -0.43 days, 95% CI: -0.73, -0.13; P = .004) and in-hospital mortality (WMD = -0.001, 95% CI: -0.002, 0.001; P = .001). Moreover, early mobilization reduced the duration of mechanical ventilation (WMD = -0.16 days, 95% CI: -0.31, -0.01; P = .001) and the duration of ICU stay (WMD = -0.63 days, 95% CI: -1.01, -0.25; P = .001).

the handgrip strength (WMD = 4.03 kg, 95% CI: -0.68, 8.74; P = .094), and shorten the duration of mechanical ventilation (WMD = 0.20 days, 95% CI: -0.10, 0.50; P = .194).

2023 ESC Guidelines for the management of acute coronary syndromes

Developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC)

13.1. Cardiac rehabilitation

13.1.1. Comprehensive cardiac rehabilitation

Secondary prevention is most effectively provided through cardiac rehabilitation (CR). All ACS patients should participate in a comprehensive CR programme, which should start as early as possible after the ACS event.

included in this meta-analysis. Early mobilization reduced the duration of ICU (WMD = -0.63 days, 95% CI: -1.01, -0.25; P < .001) and the duration of hospital stay (WMD = -0.43 days, 95% CI: -0.73, -0.13; P = .004). Moreover, early mobilization reduced the duration of mechanical ventilation (WMD = -0.16 days, 95% CI: -0.31, -0.01; P = .001) and the duration of hospital stay (WMD = -0.43 days, 95% CI: -0.73, -0.13; P = .004). Moreover, early mobilization reduced the risk of thrombosis (RR = 0.11, 95% CI: 0.01, 0.21; P < .001). However, early mobilization did not significantly improve the handgrip strength (WMD = 4.03 kg, 95% CI: -0.68, 8.74; P = .094), and shorten the duration of mechanical ventilation (WMD = 0.20 days, 95% CI: -0.10, 0.50; P = .194).

Mobilizzazione precoce nella SINDROME CORONARICA ACUTA (SCA)

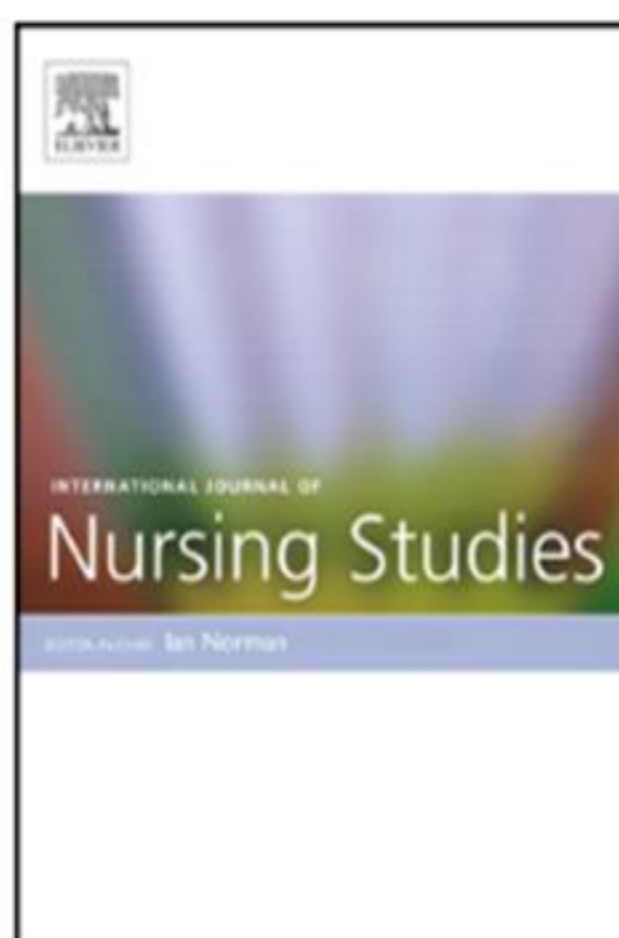
Bed rest duration and complications after transfemoral cardiac catheterization: a network meta-analysis

Erica Busca ^{1*†}, Chiara Airoidi ^{1†}, Fabio Bertoncini², Giulia Buratti², Roberta Casarotto³, Samanta Gaboardi³, Fabrizio Faggiano ^{1,4}, Michela Barisone ¹, Ian R. White⁵, Elias Allara ^{1,6‡}, and Alberto Dal Molin ^{1‡}

Contents lists available at [SciVerse ScienceDirect](#)

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journal homepage: www.elsevier.com/ijns



Results



A short bed rest, as early as 2 hours can be safely implemented

The greater the duration of bed rest the more likely patients were to experience back pain

Early ambulation after diagnostic transfemoral catheterisation had no significant effect on the incidence of vascular complications including bleeding, haematoma, bruising, pseudoaneurysm, thrombus and arteriovenous fistula. However, early ambulation was associated with a lower level of back pain intensity and urinary discomfort compared to late ambulation. The results of this review suggest that patients can be ambulated 2–3 h after transfemoral catheterisation, and that early ambulation had no effect on the risk of vascular complications and may reduce back pain intensity and urinary discomfort.

Review

Early ambulation after diagnostic transfemoral catheterisation: A systematic review and meta-analysis

Mina Mohammady^a, Kazem Heidari^b, Ali Akbari Sari^{c,*}, Mitra Zolfaghari^a, Leila Janani^b

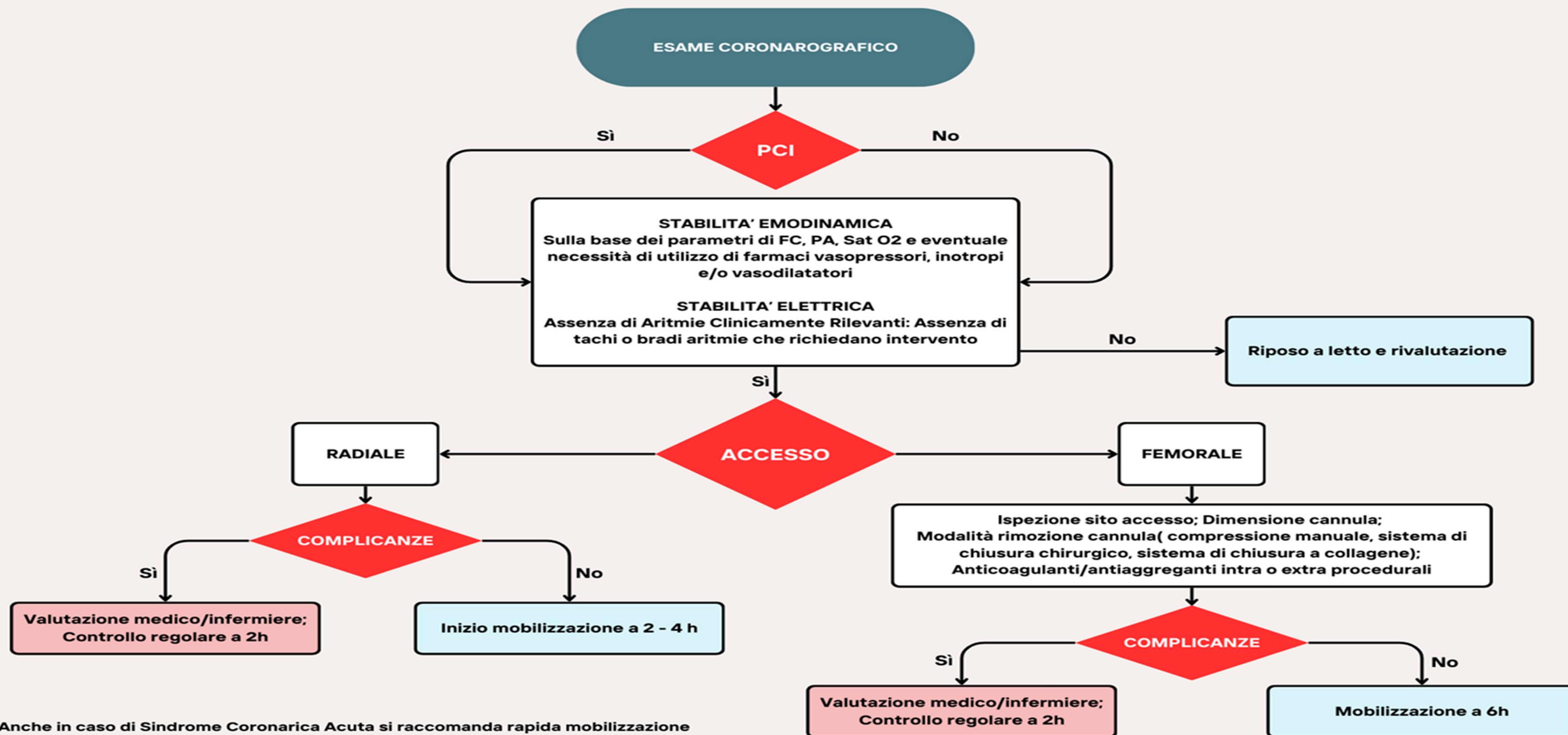
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Note: Lorem ipsum dolor sit amet, qui at nemore referrentur, enim atomorum quo ex

FLOW CHART SCA



Anche in caso di Sindrome Coronarica Acuta si raccomanda rapida mobilizzazione (ad es. già dal primo giorno), mantenendo il monitoraggio ECG per almeno 24h

Mobilizzazione precoce in paziente con SCOMPENSO CARDIACO

Il programma di mobilizzazione è sicuro e ben tollerato dai pazienti con scompenso acuto:

- degenza ospedaliera più breve
- tasso più elevato di dimissione a domicilio e diminuzione della riammissione
- riduzione degli oneri riabilitativi post-ricovero
- migliore funzione fisica

Table 1. Criteria for Change in Progressive Mobilization Program Stage in HF	
(A) The criteria to increase the stage require confirmation that there are none of the following findings during physical therapy:	
<ul style="list-style-type: none"> • Insufficient mobility function required at the next stage • ≥ 20-mmHg decrease in SBP and/or ≥ 10mmHg in DBP (postural hypotension) • ≥ 30-beats/min increase in heart rate • $>4\%$ decrease in SpO₂ • Symptoms: angina, palpitations, dizziness, nausea, fatigue, and dyspnea with ≥ 14 on the Borg Rating of Perceived Exertion Scale (6–20) 	
(B) The criteria to decrease the stage require 1 major or ≥ 2 minor criteria.	
Major criteria:	
<ul style="list-style-type: none"> • Falling down or related injuries on the ward • Heart rate at rest <40beats/min or >130beats/min • New onset of arrhythmias • Any increase in plasma BNP or NT-proBNP compared with the previous value • Larger cardiothoracic ratio than the last ratio on chest X-ray • >1.8-kg increase in body weight over the previous 1–3 days 	
Minor criteria:	
<ul style="list-style-type: none"> • Worsening of fatigue, edema, or dyspnea • >10-beats/min increase in heart rate over 1–3 days • Significant decrease in urine output 	

BNP, brain natriuretic peptide; DBP, diastolic blood pressure; HF, heart failure; NT-proBNP, N-terminal prohormone of brain natriuretic peptide; SBP, systolic blood pressure; SpO₂, oxygen saturation of peripheral artery.

Stage	I	II	III	IV	V	VI	VII
Mobilization process	Decompensation period	Relieved of congestion	Can sit over edge of bed	Can do passive transfer (bed to chair)	Can stand without help	Can walk with assistance	Can walk independently
Activities of Daily Living in Ward	Ambulation	On stretcher		By wheelchair			By walking
	Bladder	Urinary catheterization		Using portable toilet or go to the bathroom by wheelchair			Go to the bathroom by walking
	Bowel	On bed	Using portable toilet	Go to the bathroom by wheelchair			Go to the bathroom by walking
	Grooming	On bed			Go to the bathroom by wheelchair		Go to the bathroom by walking
	Bathing	Bed bath		Shower bath			Bathing
	Dressing	Put on the gown with help			Put on a gown with some help		Put on a gown without help
Contents of physical therapy	<input type="checkbox"/> Passive ROM	<input type="checkbox"/> Active ROM <input type="checkbox"/> Resistance Tr. <input type="checkbox"/> Sitting	<input type="checkbox"/> Calisthenic ex. <input type="checkbox"/> Standing <input type="checkbox"/> Conditioning	<input type="checkbox"/> Resistance Tr. <input type="checkbox"/> Balance Ex. <input type="checkbox"/> Endurance Tr.	<input type="checkbox"/> Resistance Tr. <input type="checkbox"/> Balance Ex. <input type="checkbox"/> Endurance Tr.	<input type="checkbox"/> Resistance Tr. <input type="checkbox"/> Endurance Tr. <input type="checkbox"/> Advanced Tr.	
Recommended physical activity (daytime)	Bed rest		Sit as much as possible			Walk and resistance Tr. as much as possible	
Education program				<input type="checkbox"/> Dietary sodium restriction <input type="checkbox"/> Daily weight monitoring <input type="checkbox"/> Adherence to medications	<input type="checkbox"/> Lifestyle modifications <input type="checkbox"/> Smoking cessation <input type="checkbox"/> What to do if symptoms worsen		

METs: 1.0 – 1.3 METs [On bed], 1.3 – 2.3 METs [Sitting or wheelchair], 2.3 – 2.5 METs [Walking]

Figure 1. Staged mobilization program for patients with acute heart failure developed on the basis of patient condition and possible mobility in a general ward with corresponding metabolic equivalents (MET). ROM, range of motion.

FLOWCHART - SCOMPENSO CARDIACO



(*) Considerare, accertando la stabilità clinica del paziente, l'eventuale rimozione precoce di accessi vascolari, in particolare se in sede femorale.





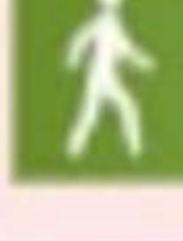
Criteria per la mobilitazione del paziente con SCOMPENSO CARDIACO

Requisiti necessari per la mobilitazione del paziente:

- Non sono state registrate cadute recenti e/o non presenta lesioni ad esse correlate
- Non presenta instabilità emodinamica e/o aritmica

Al raggiungimento dell'obiettivo mobilitazione precoce del paziente collabora tutto il team multiprofessionale (infermiere, medico, fisioterapista).

Exclusion criteria for activities (Apart from any nurse identified relevant issues)	(a) Devices Femoral sheath (venous or arterial) IABP Intubated (for levels ≥2) TVP (for levels ≥2)	(b) Haemodynamic Systolic BP ≤90 or ≥200 HR ≤50 or ≥130 (CSx: ≥150 if not sinus tachycardia) Active ischaemia <12 hr (or <24 hr if awaiting CSx) New IV anti-arrhythmia meds ≤24 hr (if arrhythmia persists) Increased inotrope/vasopressor dose in last 2 hr	(c) Respiratory RRs10 or ≥35 FiO2>60% SpO2<90% (unless ↓ target) Mechanical ventilation	(d) Neurologic Seizures ≤ 24 hr
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Level of Function 0 Bed Immobile (RASS -5 to -3)	Level of Function 1 Bed Activity (RASS -2 to 0)	Level of Function 2 Able to Sit
 <p>Goal: Maintain ROM</p> <p>Activities: 1. Turn and position q2h 2. Passive ROM 3. HOB 30°–45°</p>	 <p>Goal: Maintain clinical stability and encourage patient participation</p> <p>Activities: 1. Assist patient in turn and position q2h 2. Assisted to active ROM exercises 3. Cardiac chair as tolerated</p>	 <p>Goal: Improve strength, tolerate upright sitting, move against gravity</p> <p>Activities: 1. Regular chair x30min 2. Active ROM 3. Sitting position or edge of bed during ADLs</p>
Level of Function 3 Able to Stand	Level of Function 4 Walks < 20 m	Level of Function 5 Walks > 20 m
 <p>Goal: Stand with assist, OOB to chair, increase endurance</p> <p>Activities: 1. Transfer to chair or commode with assistance X1–2 for ADLs 2. Regular chair X 60 min during meals 3. Standing as tolerated and stepping in place</p>	 <p>Goal: Ambulate short distances, ADLs with assistance</p> <p>Activities: 1. Independent transfers to chair at least for meals and ADLs 2. Repeated sit to stand at bedside or chair 3. Short walks, including to bathroom and back</p>	 <p>Goal: Increase general endurance and mobility</p> <p>Activities: 1. OOB ≥ 4 hr per shift 2. Assist ADLs with setup only 3. Progressive walking around unit</p>

Definitions of Level of Function (LOF)

LOF 0: RASS -5 to -3, pt is not responsive, not able to cooperate in care and is bedbound.

LOF 1: RASS -2 to 0, pt may be alert, able to cooperate with some exercises in bed, despite being drowsy at times.

LOF 2: Pt is alert, strength allows for sitting up during prolonged periods at a time but not yet able to weight bear.

LOF 3: Pt is alert, strength allows for standing activities and can actively participate in transfers to chair or commode, but has yet to mobilize in the room.

LOF 4: Pt is alert, tolerates walking in the room, but easily and independently transfers to chair/bathroom on his own.

LOF 5: Pt is alert, able to tolerate increased distances in walking around the unit.

Adverse Events a. SpO2<85% b. Significant ↑ in RR c. Abrupt Δ in mental status d. HR ≤50 or ≥130 e. SBP<85 mmHg or >190 f. Fall g. Line dislodgement



Mobilizzazione precoce post TAVI

Early mobilisation after transfemoral transcatheter aortic valve implantation: results of the MobiTAVI trial

J. Vendrik  · W. Vlastra · M. S. van Mourik · R. Delewi · M. A. Beijk · J. Lemkes · J. J. Wykrzykowska · R. J. de Winter · J. S. Henriques · J. J. Piek · M. M. Vis · K. T. Koch · J. Baan Jr.

Early mobilisation (ambulation 4–6 h post-procedure) is feasible and safe after TF-TAVI. Additionally, early ambulation benefits the patients by decreasing the combined incidence of delirium, infections, pain and unplanned urinary catheter use, and thus it may be beneficial to adopt such a protocol into contemporary TAVI practice.

Non differenze di complicanze vascolari, nè sanguinamenti

Riduzione endpoint combinato di dolore, infezioni, delirium, necessità di cateterizzazione nel gruppo early

	EARLY (n= 73)	REGULAR (n= 77)	p-value
SAPIEN 3	68 (93.2%)	74 (96.1%)	0.309
Valve size distribution (20/23/26/29 mm) ^a	0/24/25/13	2/32/29/10	0.367
Arterial closure valve side (double Proglide/single Proglide/Manta/Prostar)	62/1/5/5	66/2/2/7	0.550
Arterial closure non-valve side (single Proglide/Angioseal/none)	30/41/2	35/40/2	0.865
Time to mobilisation	4 h 49 min ± 31 min	20 h 7 min ± 3 h 6 min	<0.0001
<i>Primary endpoint:</i>			
Major vascular complications	0	0	–
Major bleeding complications	0	0	–
Minor vascular complications	4 (5.5%)	6 (7.8%)	0.570
Minor bleeding	4 (5.5%)	6 (7.8%)	0.570
<i>Secondary endpoints:</i>			
Pain ^b	4 (5.5%)	8 (10.4%)	0.218
Infection	2 (2.7%)	3 (3.9%)	0.693
Delirium	1 (1.4%)	2 (2.6%)	0.591
Unplanned urinary catheter use	3 (4.1%)	8 (10.4%)	0.140
– Combined endpoint ^c	9 (12.3%)	20 (26.0%)	0.034
Prolonged hospitalisation ^d	30 (41.1%)	40 (51.9%)	0.183
Duration of hospital stay (median days [IQR])	3 (2–5)	4 (2–6)	0.243

All data are presented as mean ± standard deviation or as number of patients and percentage of subgroup
^aOnly for the SAPIEN 3
^bPresence of pain the next morning is defined as a Numerical Rating Scale/Visual Analogue Scale score >3 during the start of the day shift
^cCombined secondary endpoint: incidence of pain, infection, delirium and urinary catheter use (some patients had >1 endpoint)
^dDefined as post-procedural hospital stay >3 days

Mobilizzazione precoce post TAVI

Early mobilization after transcatheter aortic valve implantation: observational cohort study

Sandra B. Lauck ^{1,2*}, Maggie Yu¹, Carrie Bancroft², Britt Borregaard ^{3,4}, Jopie Polderman^{2*}, Anna L. Stephenson^{1,2}, Eric Durand ⁵, Mariama Akodad⁶, David Meier⁷, Holly Andrews², Leslie Achtem², Erin Tang^{1,2}, David A. Wood^{1,8}, Janarthanan Sathanathan ^{1,8}, and John G. Webb^{1,2,8}

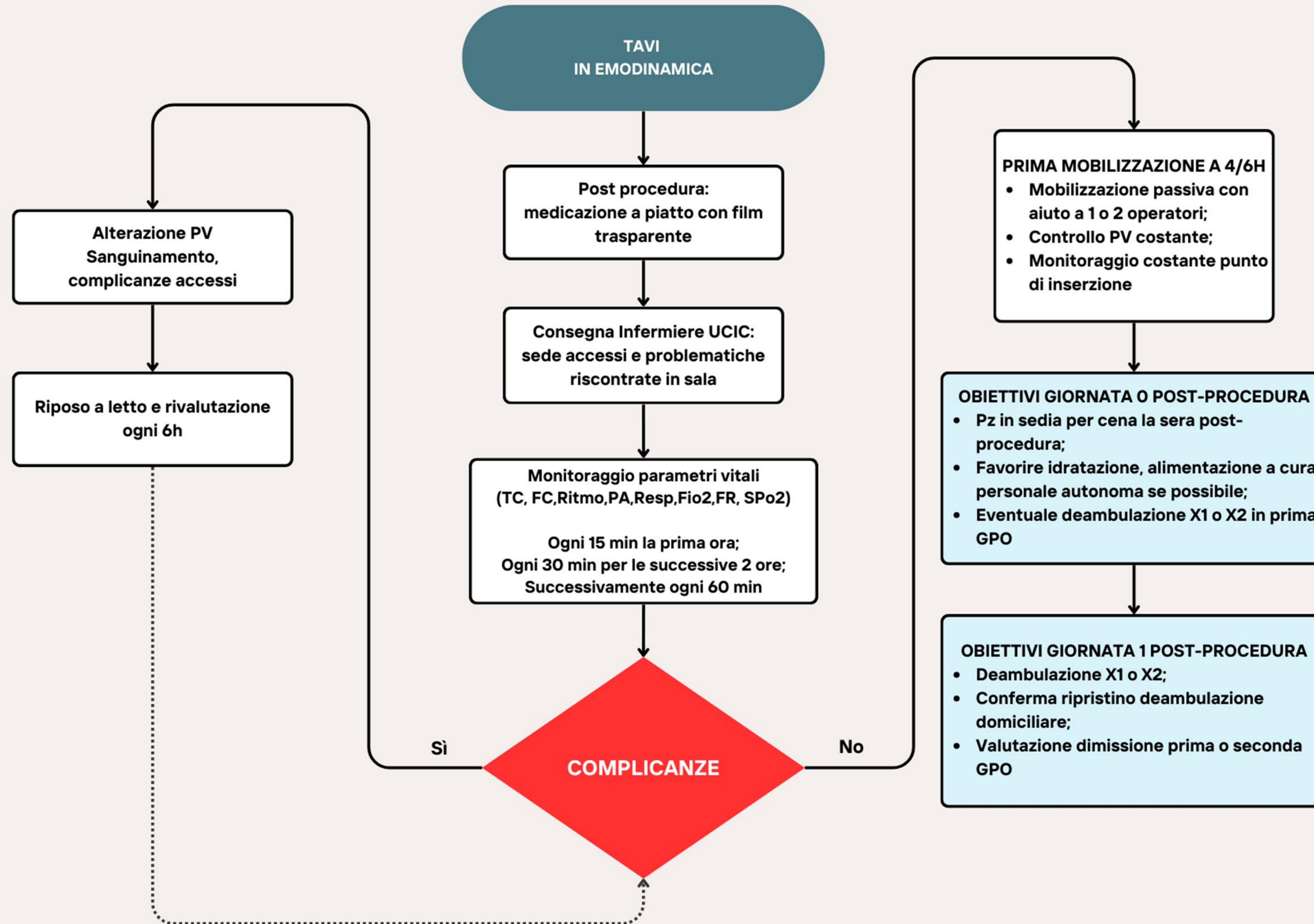
¹School of Nursing, University of British Columbia, Centre for Heart Valve Innovation, St. Paul's Hospital, 5248-1081 Burrard Street, Vancouver, BC V6Z 1Y6, Canada; ²St. Paul's Hospital, Vancouver, Canada; ³Department of Cardiac, Thoracic and Vascular Surgery, Odense University Hospital; ⁴Department of Clinical Research, University of Southern Denmark; ⁵Department of Cardiology Normandie Université CHU Rouen Rouen France; ⁶Institut cardiovasculaire Paris Sud, hôpital Privé Jacques-Cartier, Ramsay Santé, Massy, France; ⁷Department of Cardiology, Lausanne University Hospital, Lausanne University, Lausanne, Switzerland; and ⁸Centre for Cardiovascular Innovation, Vancouver, Canada

Nurse-led mobilization 4 h after TAVI is feasible for most patients who receive post-procedure care in cardiac telemetry or critical care units and is an important intervention to mitigate the risks associated with treating patients with heart valve disease. This study adds new evidence that suggests that TAVI is becoming a routine procedure amenable to standardized care and a streamlined approach to facilitate patients' rapid return to baseline status and safe return home. In this new context, quality improvement that leverages contemporary evidence is essential to improving access to care and encouraging multidisciplinary teams to review, revise, and recalibrate best practices to promote excellent outcomes and appropriate health service delivery.



Standardized nurse-led mobilization 4 hours after TAVI is feasible for most patients in the absence of clinical complications and system barriers

FLOW CHART TAVI



Grazie a tutti



per la vostra attenzione

Mobilizzazione precoce dopo IMA

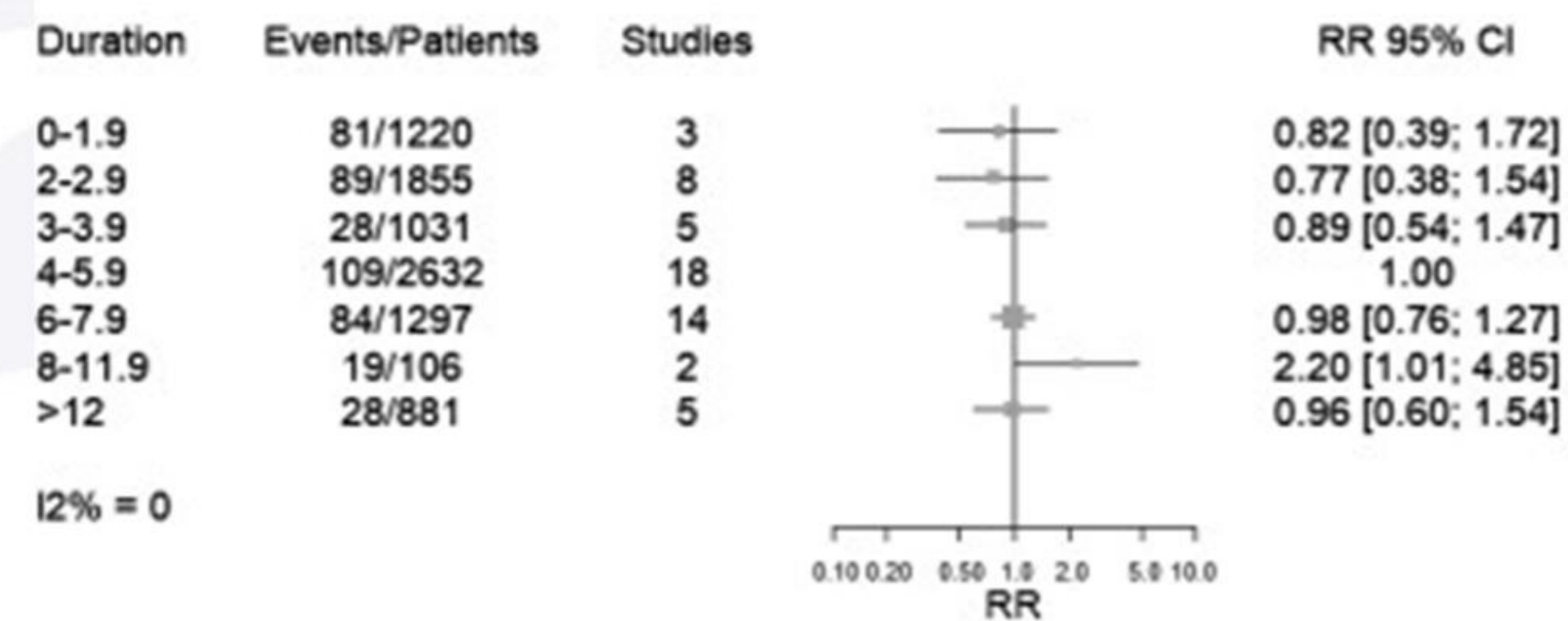
- Sicurezza rispetto a procedura effettuata
- Sicurezza rispetto a setting clinico del paziente

Mobilizzazione precoce dopo coro TF

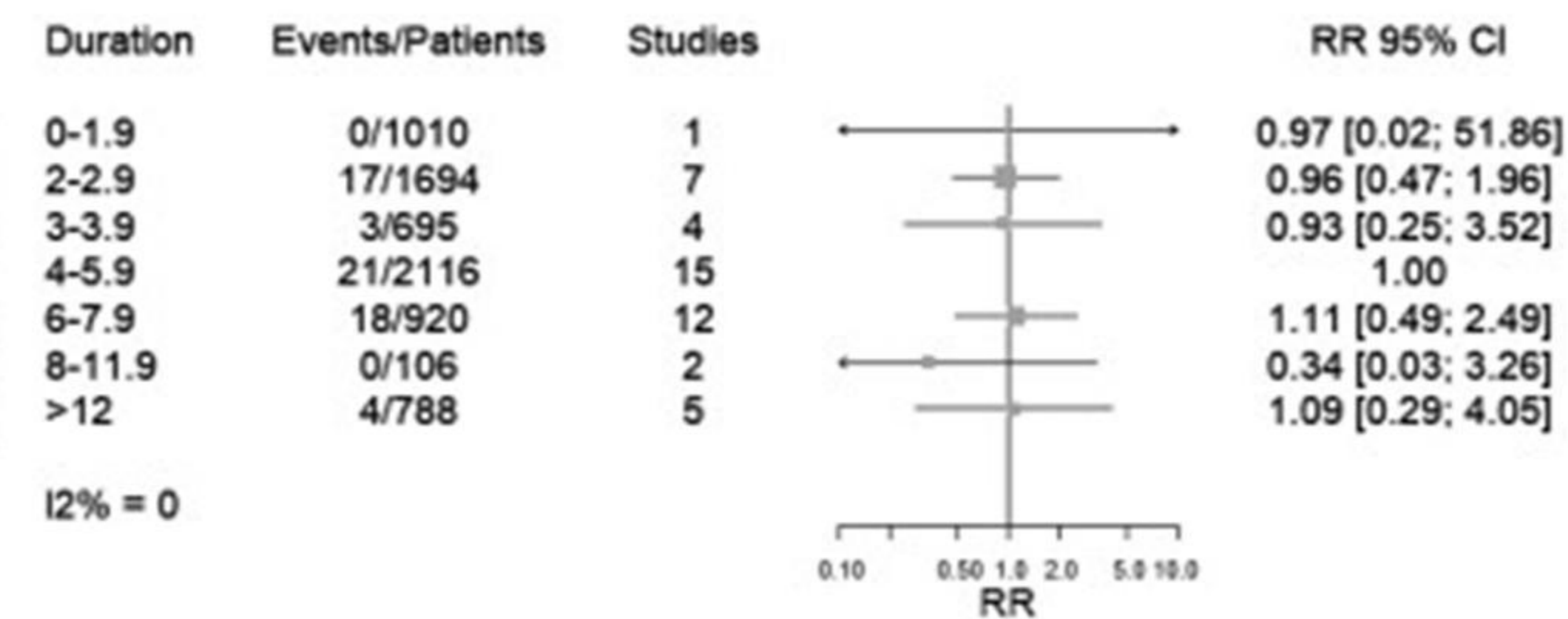
Bed rest duration and complications after transfemoral cardiac catheterization: a network meta-analysis

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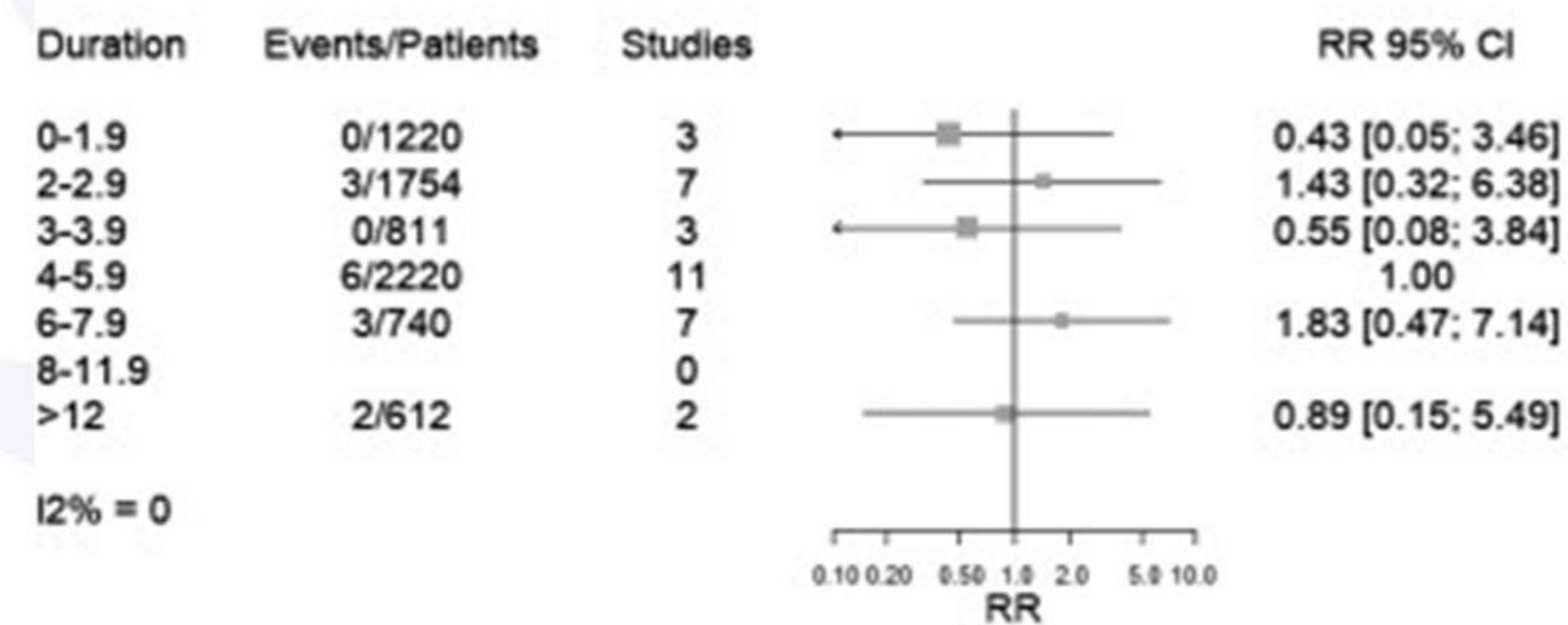
A Hematoma (N=26 studies)



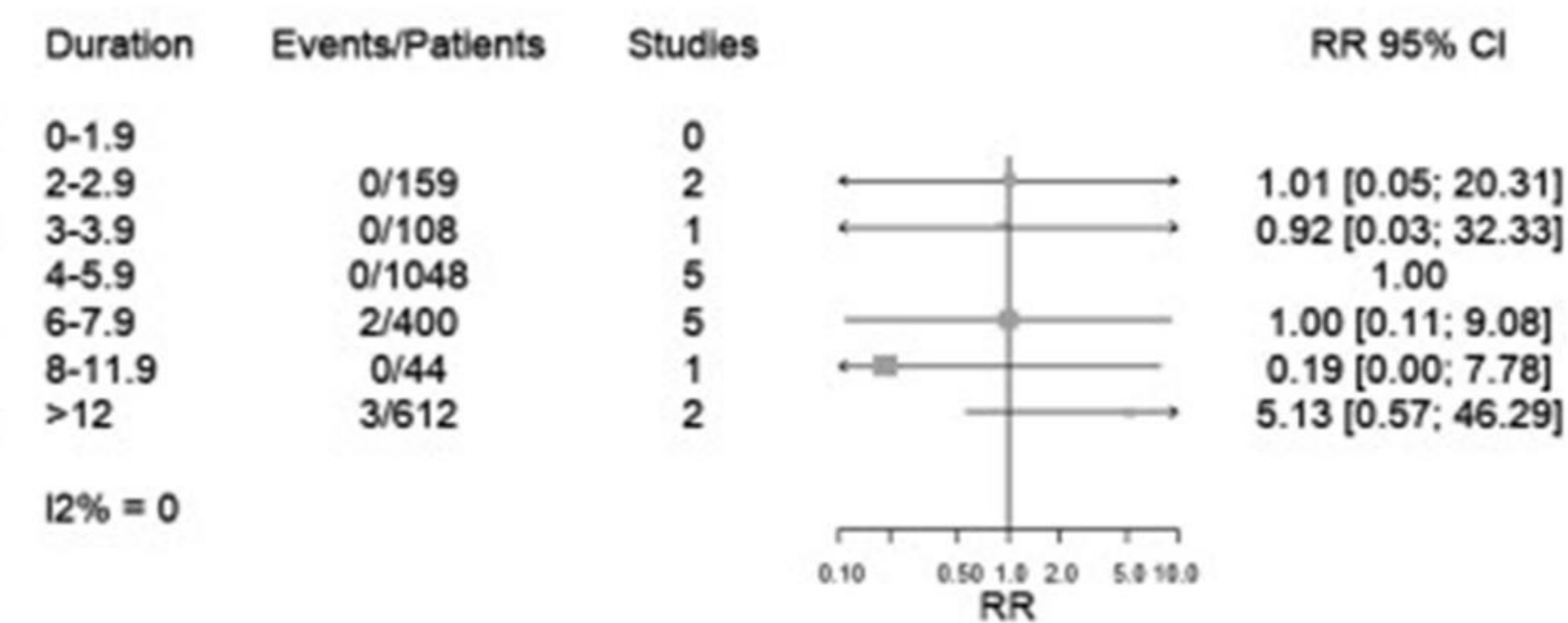
B Bleeding (N=22 studies)



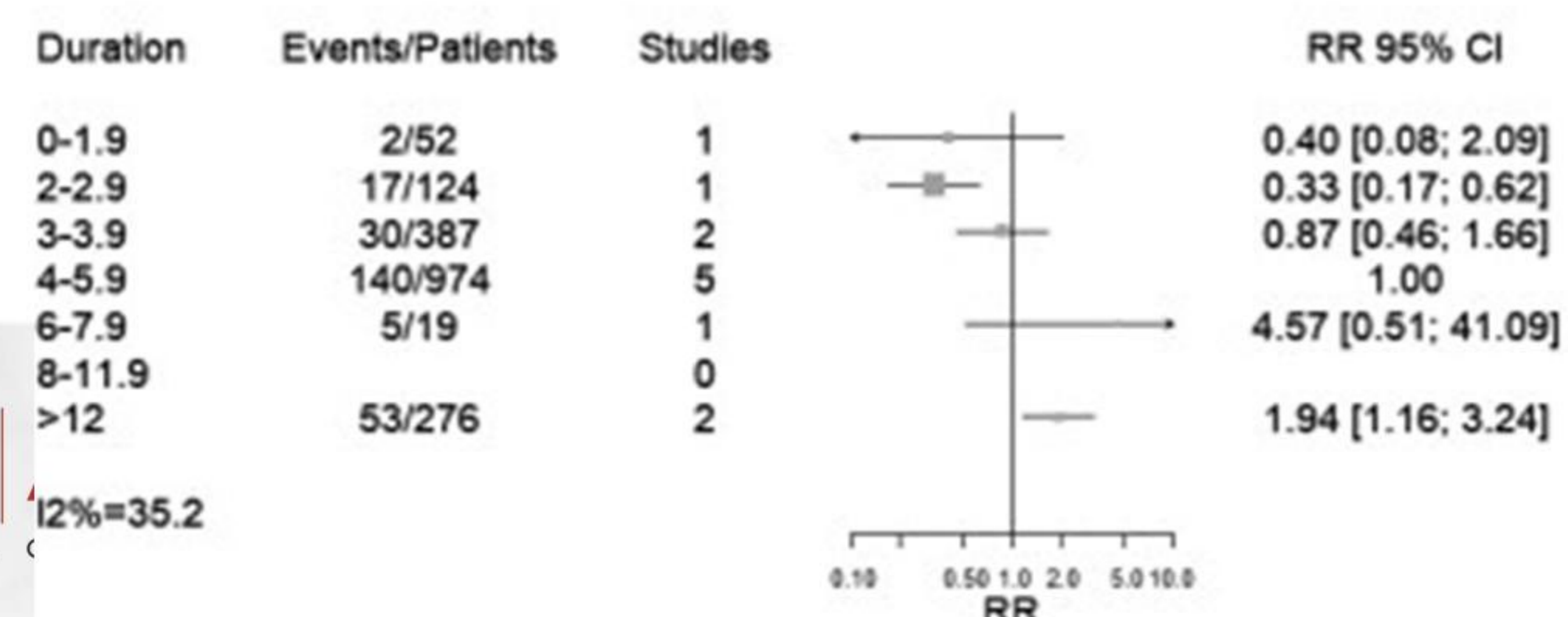
C Pseudoaneurysm (N=15 studies)



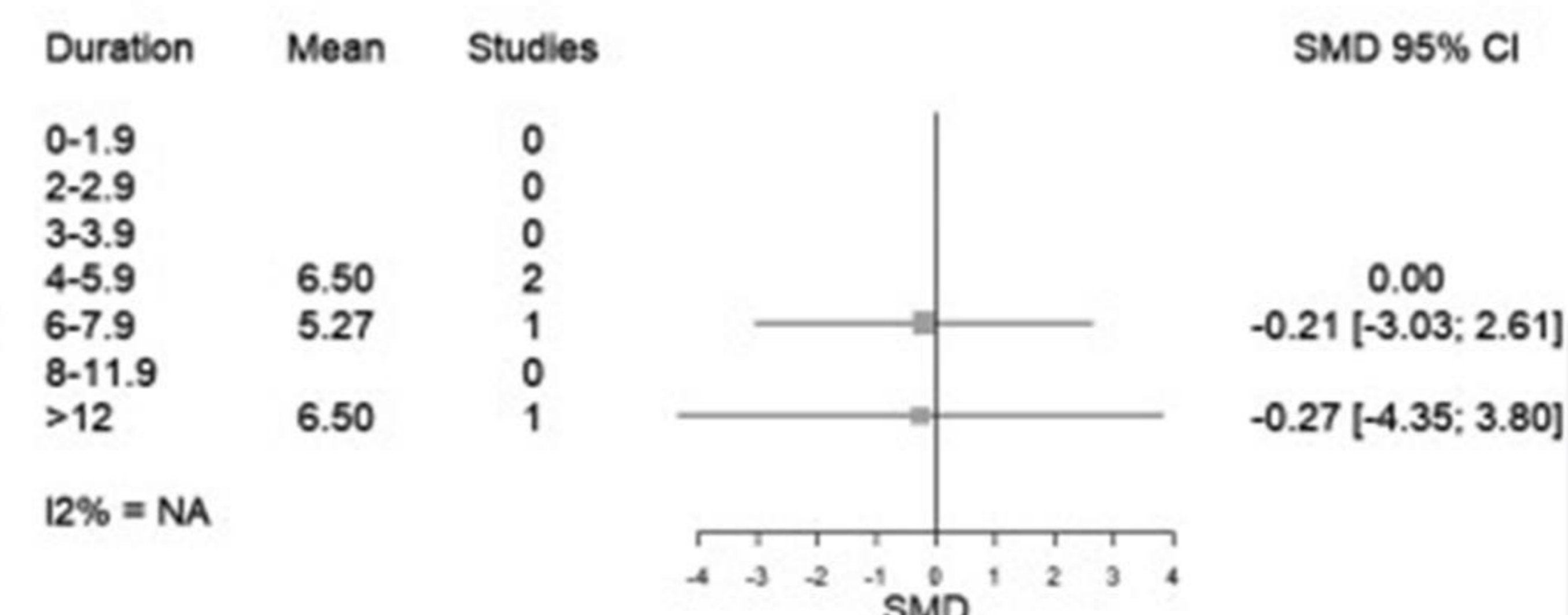
D Arteriovenous fistula (N=7 studies)



E Back pain (binary) (N=6 studies)



F General discomfort (N=2 studies)



Nessuna differenza in termini di ematoma, sanguinamenti, pseudoaneurismi, fistole arterovenose.

Riportata riduzione del dolore alla schiena nel gruppo della mobilizzazione precoce.

Early mobilization post-myocardial infarction: A scoping review

Haroon Munir¹, Jake Fromowitz², Michael Goldfarb^{1,3*}

¹ Division of Experimental Medicine, McGill University, Montreal, QC, Canada, ² Nova Southeastern University, Fort Lauderdale, FL, United States of America, ³ Division of Cardiology, Jewish General Hospital, McGill University, Montreal, QC, Canada

Study/Year	Cardiac Device	No. & Population	EM Intervention	EM Results/Recommendation
Perme. 2013	Femoral venous catheter	77 pts. with femoral catheters in the cardiac intensive care unit	210 physiotherapy activities with 630 mobility activities (sitting at bed side, standing at bedside, transfer to chair, walking).	No catheter related adverse events. Early mobilization after femoral catheter intervention is important in minimizing functional decline
Damluji, A. 2013	Femoral venous catheter	101 pts. with femoral catheters in the medical intensive care unit	In-bed exercises, supine cycle ergometry, sitting and standing/walking.	No catheter-related adverse events.
Fowlow, B. 1995	Femoral arterial catheter	85 pts. admitted to intensive care unit after elective percutaneous transluminal coronary angioplasty (PTCA)	Randomly assigned pts. to 6 or 8 hours after sheath removal	Ambulation 6 hours post-sheath removal resulted in no significant increases in hematoma formation at puncture site compared to group ambulated 8 hours post procedure. Early mobilization group had significantly lower pain scores than late group at 8 hours.
Mah, J. 1999	7 French (F) arterial catheter	880 patients post-7F catheter procedure	3-hour ambulation post procedure (early) or 5-hour ambulation (late)	Early mobilization group had significantly lower bleeding and hematoma formation compared to late mobilization group. Concluded that early mobilization post-cardiac catheterization is safe, can decrease hospital stay and increase patient comfort.
Kagoshima, M. 2000	Radial artery catheters Femoral arterial catheter	89 patients, 32 of which treated with new transradial approach, 57 treated by old protocol	Rapid mobilization and discharge involve walking on ward on third day following procedure & encouragement of discharge within 2 weeks.	Shortened hospital stay with no increase in in hospital mortality, cardiac events or decline of left ventricular function.
Kim, K. 2013	Various catheters and sheaths	Variable (metanalysis)	Variable bed rest durations and early mobilization protocols	Early mobilization following percutaneous coronary intervention had no effect on hematoma formation or bleeding at puncture site.

Mobilizzazione precoce dopo IMA

Safety of early discharge in low risk patients after acute ST-segment elevation myocardial infarction, treated with primary percutaneous coronary intervention. Open label, randomized trial

Kamil Novobilsky^a, Roman Stipal^a, Petr Cerny^a, Ivo Horak^a, Vladimir Kaucak^a, Jan Mrozek^a, Jan Vaclavik^b, Radim Kryza^a

Table 1. Inclusion criteria.

- STEMI treated with successful primary PCI within 12 h of the symptom onset (TIMI flow 3 in infarct-related artery)
- Age ≤ 75 years
- Left ventricular ejection fraction ≥ 45%
- Single- or two-vessel disease
- No symptoms of residual ischaemia
- Haemodynamical and rhythmical stability (Killip class I, no arrhythmia requiring treatment occurring > 2 h after PCI)
- Absence of comorbidities, requiring continuation of hospitalization
- Absence of contraindication for dual antiplatelet treatment or need for anticoagulation
- Supposed cooperation, adherence to medical measures and social background

Table 4. Results.

	Early discharge		Standard discharge		<i>P</i>
	n	%	n	%	
Primary composite endpoint	5	6.6	6	8.0	0.765
Death	0	0	0	0	-
Myocardial infarction	1	1.3	2	2.7	0.620
Unstable angina	1	1.3	1	1.3	1
Unplanned rehospitalization	5	6.6	6	8.0	0.765
Repeated target vessel revascularization	1	1.3	3	4.0	0.367
Stent thrombosis	0	0	2	2.7	0.245
Stroke	0	0	0	0	-

CONCLUSION

This prospective, open-label, randomized study showed that early discharge (within 48 - 72 h) in selected low risk patients after STEMI treated with successful primary PCI is feasible and safe. This strategy applies to more than a quarter of all STEMI patients and may be adopted in everyday clinical practice, provided the appropriate follow-up management is arranged to ensure adequate secondary prevention measures.

Scompenso cardiaco: non sempre l'ospedalizzazione è un valore aggiunto

The HEARTRISK6 Scale

Predicting Short-Term Serious Outcomes in Emergency Department Acute Heart Failure Patients

CENTRAL ILLUSTRATION The HEARTRISK6 Scale: Predicting Short-Term Serious Outcomes in Emergency Department Acute Heart Failure Patients

Progressive Mobilization Program for Patients With Acute Heart Failure Reduces Hospital Stay and Improves Clinical Outcome

Naoya Kakutani, BSc; Arata Fukushima, MD, PhD; Shintaro Kinugawa, MD, PhD; Takashi Yokota, MD, PhD; Tatsuya Oikawa, MD; Mikito Nishikawa, MD, PhD; Risako Nakamura; Takanori Tsukada; Shigeki Mori; Ichiro Yoshida, MD; Toshihisa Anzai, MD, PhD

			8	46.0%	High
			9	53.9%	
			≥10*	61.6%	

Stiell IG, et al. JACC Adv. 2024;3(7):100988.

Components of the HEARTRISK6 scale. *No patient had a score >11. ED = emergency department.

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^cCombined secondary endpoint: incidence of pain, infection, delirium and urinary catheter use (some patients had >1 endpoint)

Take Home Messages

- La mobilitazione precoce è fondamentale per **permettere la riduzione di eventi avversi legati all'allettamento prolungato**
- La mobilitazione precoce deve essere un **obiettivo primario del ricovero**
- **Protocolli personalizzati** di mobilitazione devono essere valutati per ogni paziente in base a setting clinico e procedure effettuate
- La **comunicazione e collaborazione tra equipe di sala ed equipe di UTIC, e tra equipe medica ed equipe infermieristica** è un punto cardine per il raggiungimento dell'obiettivo della mobilitazione precoce

Grazie!

