Outcome after resuscitation beyond 30 minutes in drowned children with cardiac arrest and hypothermia: Dutch nationwide retrospective cohort study

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EDITORIAL by Maconochie and Deakin

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Cite this as: *BMJ* 2015;350:h418
doi: 10.1136/bmj.h418

This is a summary of a paper that was published on thebmj.com as *BMJ* 2015;350:h418

STUDY QUESTION

Does resuscitation beyond 30 minutes in drowned children with cardiac arrest and hypothermia lead to a good outcome?

SUMMARY ANSWER

None of the 98 drowned children who required resuscitation beyond 30 minutes for cardiac arrest with hypothermia during a 19 year period in the Netherlands had a good outcome.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

The importance of prolonged resuscitation has been well established for accidental hypothermic cardiac arrest (without asphyxia). The present results, however, do not support resuscitation beyond 30 minutes in drowned children with (asphyxial) cardiac arrest and hypothermia.

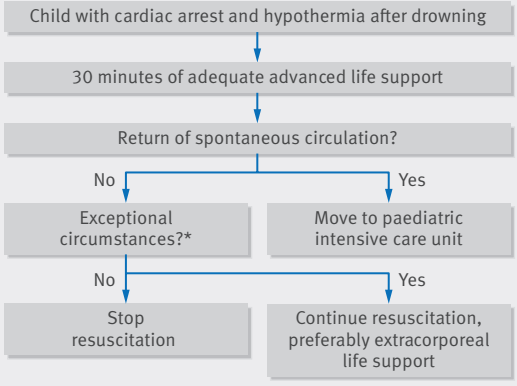
Participants and setting

All children aged up to 16 with cardiac arrest and hypothermia (core body temperature <34°C) after drowning, who presented at the emergency department and/or were admitted at a paediatric intensive care unit.

Design, size, and duration

This was a nationwide retrospective cohort study of all children with cardiac arrest and hypothermia after drowning outside in 1993-2012. We excluded children who drowned in a traffic or boating incident. Poor outcome was defined as death or a paediatric cerebral performance category (PCPC) score ≥4 (that is, severe neurological disability or vegetative state) at one year after the drowning incident. The starting point of the resuscitation time was marked by the initiation of chest compressions by the emergency medical service and the total duration included prehospital and in hospital advanced life support but excluded bystander cardiopulmonary resuscitation.

Decision tree for continuation of resuscitation beyond 30 minutes in children with cardiac arrest and hypothermia (core body temperature <34°C) after drowning outside in temperate climate



*Exceptional circumstances include:
Motor vehicle or boat incident with possible air bubble inside
Immersion before submersion
Winter season
Rapidly streaming water
Bradycardia or ventricular fibrillation at start of advanced life support
Bradycardia or ventricular fibrillation after 30 minutes of advanced life support

Main results and the role of chance

Resuscitation was performed for more than 30 minutes (median duration 60 minutes) in 98 (61%) of 160 drowned children with cardiac arrest and hypothermia. Of these 98 children, 87 (89%, 95% confidence interval 83% to 95%) died and 11 (11%, 5% to 17%) survived with a PCPC score ≥4. In the 62 children who did not require prolonged resuscitation, 17 survived with a PCPC score ≤3 (27%, 16% to 38%). These findings suggest that there is no therapeutic value of resuscitation beyond 30 minutes for drowned children with cardiac arrest and hypothermia. We propose a decision tree for termination of resuscitation after 30 minutes to be used in children with cardiac arrest and hypothermia after drowning outside in a temperate climate.

Bias, confounding, and other reasons for caution

There are exceptional circumstances that could lead to rapid hypothermia or hypothermia before asphyxia, which could have a protective effect on cerebral damage; these include drowning in winter or drowning inside a motor vehicle or boat (with a possible air bubble inside). Our findings do not support a change in the current recommendation (to continue resuscitation until the child is rewarmed) for children who drown under exceptional circumstances, as specified in the proposed decision tree.

Generalisability to other populations

This study was conducted in a temperate climate. The indicated range of water temperatures during the Dutch seasons could help with translating the findings to other climates.

Study funding/potential competing interests

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Trajectories of risk after hospitalization for heart failure, acute myocardial infarction, or pneumonia: retrospective cohort study

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Cite this as: *BMJ* 2015;350:h411
doi: 10.1136/bmj.h411

This is a summary of a paper that was published on thebmj.com as *BMJ* 2015;350:h411

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Video abstract: Lead author Kumar Dharmarajan talks about this paper in a video abstract

Access the peer review history of this paper at http://www.bmj.com/content/350/bmj.h411/peer-review

STUDY QUESTION

How do the absolute risks of readmission to hospital and death change with time in the year after hospital discharge for older patients hospitalized with heart failure, acute myocardial infarction, or pneumonia?

SUMMARY ANSWER

The absolute risks of readmission and death are noticeably increased after hospital discharge and variably decline over time by discharge diagnosis and outcome.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Patients are at high risk for readmission to hospital and death in the month after discharge. In this study the risk of death declined relatively rapidly, whereas the risk of readmission remained increased for a longer period. Although prolongation of risk was most pronounced after hospitalization for heart failure, patients admitted with any of the three conditions were at noticeably higher risk of adverse outcomes than the general elderly population for the full year after hospital discharge.

Participants and setting

Medicare fee for service beneficiaries in the United States aged 65 years and older who survived hospitalization for heart failure, acute myocardial infarction, or pneumonia from 2008 to 2010.

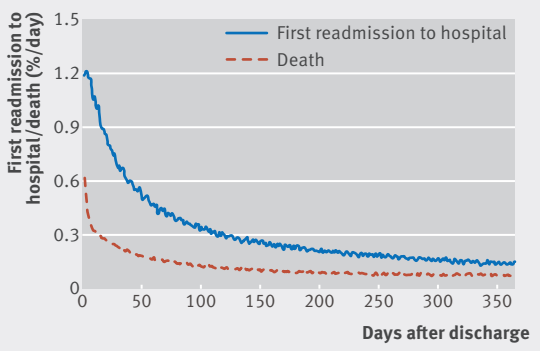
Design, size, and duration

Retrospective cohort study of hospitalizations. We fit separate survival models to define the daily absolute risks of first readmission and death for one year after hospital discharge. To illustrate risk trajectories we identified the time required for the risks of readmission and death to decline 50% from maximum values after discharge; the time required for risks to approach plateau periods of minimal day to day change, defined as 95% reductions in daily changes in risk from maximum daily declines after discharge; and the degree to which risks are higher among patients recently discharged from hospital compared with the general elderly population.

Main results and the role of chance

Within one year of hospital discharge, readmission to hospital and death, respectively, occurred following 67.4% and 35.8% of hospitalizations for heart failure, 49.9% and 25.1% for acute myocardial infarction, and 55.6% and 31.1% for pneumonia. Risk of first readmission had declined 50% by day 38 after hospitalization for heart failure, day 13 after hospitalization for acute myocardial infarction, and day 25 after hospitalization for pneumonia; risk of death declined 50% by day 11, 6, and 10, respectively. Daily change in risk of first readmission to hospital declined 95% by day 45, 38, and 45 respectively; daily change in risk of death declined 95% by day 21, 19, and 21 respectively. After hospitalization for heart failure, acute myocardial infarction, or pneumonia, the magnitude of the relative risk for hospital admission over the first 90 days was 8, 6, and 6 times greater than that of the general older population respectively; the relative risk of death was 11, 8, and 10 times greater.

Risk of first readmission to hospital and death by day after hospitalization for heart failure



Bias, confounding, and other reasons for caution

We relied on claims data to define our patient cohorts. We did not include patients with Medicare Advantage health insurance.

Generalisability to other populations

Findings should be broadly generalizable to older people, as we examined approximately 1 460 000 hospitalizations for heart failure, 560 000 for acute myocardial infarction, and 1 200 000 for pneumonia among older Medicare beneficiaries. This large study showed consistent findings in readmission and mortality trajectories across three conditions. Data were, however, derived from the United States only.

Study funding/potential competing interests

This study was funded by grant 1U01HL105270-04 from the National Heart, Lung, and Blood Institute (NHLBI). At the time this study was performed, AFH, ZL, JSR, LIH, NK, LGS, SMB, EED, and HMK worked under contract with the Centers for Medicare & Medicaid Services (CMS) in the United States to develop and maintain performance measures. Neither the NHLBI nor CMS had a role in the design or conduct of the study; in the analysis and interpretation of the data; or in the preparation or approval of the manuscript.

Association of hospital volume with readmission rates: a retrospective cross-sectional study

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Cite this as: *BMJ* 2015;350:h447
doi: 10.1136/bmj.h447

This is a summary of a paper that was published on thebmj.com as *BMJ* 2015;350:h447

STUDY QUESTION

Do hospitals caring for higher volumes of patients have lower readmission rates?

SUMMARY ANSWER

No, hospitals with the highest volume of patient admissions had the highest standardized readmission rates, whereas those with the lowest volume of admissions had the lowest standardized readmission rates.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Greater hospital volume is a marker of higher quality care, associated with lower mortality and complication rates. By contrast, we find that higher hospital volume is associated with higher readmission rates, overall and within several specialty clinical cohorts of patients. This finding suggests that smaller medical centers may provide higher quality transitional care than larger centers.

Participants and setting

6 916 644 adult discharges from 4651 US acute care hospitals.

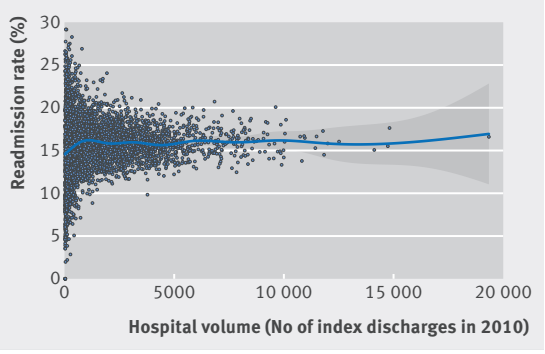
Design

Retrospective cross-sectional study.

Primary outcome

We used Medicare fee-for-service data from 1 July 2011 to 30 June 2012 to calculate observed-to-expected, unplanned, 30 day, standardized readmission rates for hospitals (standardized for age, principal diagnosis, comorbidity), and for the specialty cohorts of medicine, surgery/gynecology, cardiorespiratory, cardiovascular, and neurology.

Unplanned, all-cause, 30 day, standardized readmission rate by hospital volume



Main results and the role of chance

Mean, 30 day, standardized, readmission rate among hospitals in the fifth of hospitals with the lowest volume of admissions was 14.7% (standard deviation 5.3) compared with 15.9 (1.7) among the fifth of hospitals with the highest volume (P<0.001). We observed the same pattern of lower readmission rates in the lowest versus highest volume hospitals in the specialty cohorts for medicine (16.6% *v* 17.4%, P<0.001), cardiorespiratory (18.5% *v* 20.5%, P<0.001), and neurology (13.2% *v* 14.0%, P=0.01); the cardiovascular cohort, however, had an inverse association (14.6% *v* 13.7%, P<0.001). These associations remained after adjustment for hospital characteristics except in the cardiovascular cohort, which became non-significant, and the surgery/gynecology cohort, in which the lowest volume fifth of hospitals had significantly higher standardized readmission rates than the highest volume fifth (difference 0.63 percentage points (95% confidence interval 0.10 to 1.17), P=0.02). A composite outcome of mean 30 day, standardized mortality or readmission rate was not significantly different between highest and lowest volume fifths (20.4% *v* 20.2%, P=0.19) and was highest in the middle fifth of hospitals (range 20.6–20.8%).

Bias, confounding, and other reasons for caution

Competing risk of mortality plays a role: the smallest and largest volume hospitals had similar rates of a composite standardized outcome of mortality and readmission.

Generalisability to other populations

This study used national data from the United States and is widely generalizable to older patients. Younger patients have lower readmission rates and less comorbidity; association of volume with outcomes is unknown in this population.

Study funding/potential competing interests

The work was performed under contract to the Centers for Medicare & Medicaid Services. The Agency for Healthcare Research and Quality, the National Institute on Aging, the National Heart, Lung, and Blood Institute, and the American Federation for Aging Research provided additional support. All authors received support from the Centers for Medicare & Medicaid Services for the work. In addition, JSR is a member of a scientific advisory board for FAIR Health, HMK chairs a cardiac scientific advisory board for UnitedHealth and is the recipient of research grants from Medtronic and Johnson&Johnson through Yale University.

Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: Cochrane systematic review and meta-analysis

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Cite this as: *BMJ* 2015;350:h444
doi: 10.1136/bmj.h444

This is a summary of a paper that was published on thebmj.com as *BMJ* 2015;350:h444

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Clinical review: Opioids for low back pain (*BMJ* 2015;350:g6380)
Clinical review: Management of low back pain (*BMJ* 2008;337:a2718)

STUDY QUESTION

What are the long term effects of multidisciplinary biopsychosocial rehabilitation for patients with chronic low back pain?

SUMMARY ANSWER

Multidisciplinary rehabilitation was more effective than usual care (moderate quality evidence) and physical treatments (low quality evidence) in decreasing pain and disability in people with chronic low back pain and more effective than physical treatment (moderate quality evidence) on work outcomes.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Multidisciplinary rehabilitation programmes are widely used for people with chronic low back pain.
Patients receiving these programmes are likely to gain small, long term benefits in pain and disability compared with usual care or physical treatments and have higher odds of being at work than those receiving physical treatment.

Selection criteria for studies

We did searches in electronic databases including CENTRAL, Medline, and Embase and supplemented them by hand searches. We included randomised controlled trials in which patients with chronic (>3 months' duration) low back pain were allocated to either a multidisciplinary rehabilitation intervention or some other intervention. To be eligible, multidisciplinary rehabilitation programmes had to include a physical component plus one or both of a psychological or work targeted component; they also had to be delivered by healthcare professionals from at least two different professional backgrounds.

Effects of multidisciplinary rehabilitation

Outcome	No of RCTs/ patients	Effect size* (95% CI)	Quality
Versus usual care			
Pain	7/821	SMD 0.21 (0.04 to 0.37)	Moderate
Disability	6/722	SMD 0.23 (0.06 to 0.40)	Moderate
Work	7/1360	OR 1.04 (0.73 to 1.47)	Moderate
Versus physical treatment			
Pain	9/872	SMD 0.51 (−0.01 to 1.04)	Low
Disability	10/1169	SMD 0.68 (0.16 to 1.19)	Low
Work	8/1006	OR 1.87 (1.39 to 2.53)	Moderate

OR=odds ratio; RCT=randomised controlled trial; SMD=standardised mean difference.
*Positive values indicate that multidisciplinary rehabilitation is more effective than comparator.

Primary outcome(s)

The primary outcomes were pain, disability, and work outcomes in the long term, typically 12 months after randomisation. We synthesised outcomes by using random effects meta-analysis and determined quality of evidence by using the GRADE approach.

Main results and role of chance

The review included 41 randomised controlled trials and 6858 patients, of which 16 trials assessed the effectiveness of multidisciplinary rehabilitation versus usual care and 19 used physical treatments as the comparator. We found moderate quality evidence that multidisciplinary rehabilitation was beneficial for pain and disability but not for work outcomes versus usual care. We found low quality evidence of a beneficial effect of multidisciplinary rehabilitation on pain and disability and moderate quality evidence of an effect on work outcomes versus physical treatment. Two trials (n=426) included in the review provided low quality evidence of no difference in effect on pain, disability, and work between multidisciplinary rehabilitation and surgery. These results suggest that people with chronic low back pain who receive multidisciplinary rehabilitation will have better outcomes than those receiving usual care or physical treatment. This benefit is of only a modest size and should be considered in the context of the substantial time and resource commitments involved with these interventions.

Bias, confounding, and other reasons for caution

We assessed all studies with the Cochrane risk of bias tool, and only 13 of 41 met the pre-specified criteria for low risk of bias. Despite this, sensitivity analyses did not suggest that studies at high risk of bias unduly influenced the pooled effect estimates. However, a large degree of heterogeneity was associated with effect estimates in the physical treatment comparison. This heterogeneity is reflected in the width of confidence intervals around the effect estimates and was also incorporated into the GRADE quality assessment.

Study funding/potential competing interests

No funding was received for this work. SJK's salary is funded by the National Health and Medical Research Council of Australia. RJEMS is a member of a scientific advisory board for Philips Pain Management. RWJGO has received grants from the Scientific College of Physiotherapy of the Royal Dutch Association for Physiotherapy and from the Health Care Insurance Board. MWvT has received grants from the Royal Dutch Physiotherapy Association.