



Clinical paper

Measuring outcome after cardiac arrest: construct validity of Cerebral Performance Category[☆]M. Mak^{a,b,*}, V.R.M. Moulaert^{a,c}, R.W. Pijls^d, J.A. Verbunt^{a,c}^a Adelante, Centre of Expertise in Rehabilitation and Audiology, Zandbergsweg 111, 6432 CC Hoensbroek, The Netherlands^b Revant Rehabilitation Centre Breda, Brabantlaan 1, 4817 JW Breda, The Netherlands^c CAPHRI School for Public Health and Primary Care, Department of Rehabilitation Medicine, Maastricht University Medical Centre, PO Box 616, 6200 MD Maastricht, The Netherlands^d CAPHRI School for Public Health and Primary Care, Department of Cardiology, Maastricht University Medical Centre, PO Box 5800, 6202 AZ Maastricht, The Netherlands

ARTICLE INFO

Article history:

Received 28 September 2015

Received in revised form 1 December 2015

Accepted 16 December 2015

Keywords:

Cardiac arrest

Cerebral Performance Category

Construct validity

Outcome

International classification of functioning,

disability and health

Quality of life

ABSTRACT

Introduction: Approximately half of the survivors of cardiac arrest have cognitive impairments due to hypoxic brain injury. To describe the outcome after a cardiac arrest, the Cerebral Performance Category (CPC) is frequently used. Although widely used, its validity is still debatable.

Objective: To investigate the construct validity of the Cerebral Performance Category in survivors of a cardiac arrest.

Participants were 18 years and older that survived a cardiac arrest more than six months.

Methods: Cross-sectional design. A method to administer the CPC in a structured and reproducible manner was developed. This 'Structured CPC' was administered by a structured interview. Construct variables were Cognitive Failure Questionnaire (CFQ), Barthel Index (BI), Frenchay Activity Index (FAI), Community Integration Questionnaire (CIQ) and Quality of Life after Brain Injury (Qolibri). Associations were tested based on Spearman correlation coefficients.

Results: A total of 62 participants responded. In 58 (94%) patients the CPC was determined, resulting in CPC 1 (48%), CPC 2 (23%) and CPC 3 (23%). The CPC-scoring correlated significantly with the CFQ ($r = -0.40$); BI ($r = -0.57$); FAI ($r = -0.65$), CIQ ($r = -0.53$) and Qolibri ($r = -0.67$).

Discussion and conclusions: In this study we developed the 'Structured CPC' to improve the transparency and reproducibility of the original CPC. A moderate correlation between the 'Structured CPC' and the constructs 'activities', 'participation' and 'quality of life' confirmed the validity of the 'Structured CPC'.

Clinical message: The 'Structured CPC' can be used as an instrument to measure the level of functioning after cardiac arrest.

© 2016 Elsevier Ireland Ltd. All rights reserved.

Introduction

The survival rate of out-of-hospital cardiac arrest to hospital discharge ranges between 6.7% and 8.4%.¹

During cardiac arrest the brain suffers from temporary limitation of the blood supply. This may lead to irreversible brain damage, called hypoxic–ischemic brain injury. Cognitive impairments are found in approximately half of the survivors.² Common

symptoms of hypoxic–ischemic brain injury are disturbances of memory, attention and executive functioning.³

It is important to pay attention not only to survival but also to functional outcome after cardiac arrest. A frequently used instrument to determine outcome after cardiac arrest is the Cerebral Performance Category (CPC). The CPC consists of a 5-point scale (Table 1), in which CPC scores of 1 and 2 are mostly considered as 'good' outcomes and a CPC 3, 4 and 5 'poor' outcomes.⁴ According to the Utstein criteria, it is recommended to collect neurological outcomes at discharge, by using the CPC or modified Ranking Scale (mRS).⁶ In scientific research, the CPC has been used as an outcome variable in many studies.^{7–10} However, currently there is no standardized method to determine the CPC score. As a result, the procedure to score the CPC varies widely, for example by interpretation of retrospective chart reviews or asking persons by phone calls.

[☆] A Spanish translated version of the summary of this article appears as Appendix in the final online version at <http://dx.doi.org/10.1016/j.resuscitation.2015.12.005>.

* Corresponding author at: Revant Rehabilitation Centre Breda, Brabantlaan 1, 4817 JW Breda, The Netherlands.

E-mail address: m.mak@revant.nl (M. Mak).

Table 1
The cerebral performance category⁵.

CPC 1	Good cerebral performance. Conscious. Able to work and to live a normal life. May have minor neurological or psychological deficits
CPC 2	Moderate cerebral disability. Conscious. Sufficient for part-time work in a sheltered environment or independent activity of daily life. May have hemiplegia, seizures, ataxia, dysarthria, dysphasia of permanent memory or mental changes
CPC 3	Severe cerebral disability: conscious. Dependent for daily support on others because of impaired brain function. Has limited cognition
CPC 4	Coma or vegetative state: unconscious. Unaware of surroundings, no cognition. No verbal or psychological interactions with environment
CPC 5	Dead

In addition, it is currently unclear what construct of functioning the CPC actually aims to assess.

The International Classification of Functioning, Disability and Health (ICF) is a classification of health and health-related domains.¹¹ The ICF distinguishes three different domains of daily life functioning: ‘body functions and structures’ (e.g. blood circulation and heart), ‘activities’ (e.g. standing) and ‘participation’ (e.g. working). It is unclear which of the three domains of the ICF model represents the CPC best.

Several researchers have tried to determine the construct of the CPC by testing its association with other instruments. Correlations between the CPC, determined by retrospective chart review, and the Functional Status Questionnaire, measuring all 3 domains of the ICF, were all low at discharge and moderate at follow-up.¹² A different study, also using a retrospective chart review, found a moderate correlation between CPC and modified Ranking Scale (mRS), measuring the domain ‘activities’.¹³ In addition, compared to the Health Utilities Index (HUI), measuring quality of life, a CPC 1 was related with a good HUI and a CPC > 1 ruled out a good quality of life.⁵ In this study the CPC was evaluated by an interview.

It is remarkable that in all studies mentioned a variety of instruments were used as the construct variable, but none of the studies identified a good relationship between the CPC and the construct variables chosen. Whether this finding indicates that CPC is indeed insufficient as a measure for functioning or quality of life or whether this finding is especially due to the variety of methods used to score the CPC is currently unclear.

This shows that the construct validity of the CPC is currently still debatable. In addition, the method to administer the CPC remains unclear.

The aim of this study was to investigate the construct validity of the CPC. Therefore, we first developed a semi-structured interview to assess the CPC in a systematic way in survivors of a cardiac arrest. The construct validity of this ‘Structured CPC’ was determined by comparing outcomes on the CPC with the constructs ‘body functions and structures’, ‘activities’, ‘participation’ of the ICF model and in addition the variable ‘quality of life’.

Based on the findings in earlier studies^{12,13}, a low correlation between CPC and the construct ‘body functions and structures’, a moderate correlation between the CPC and the ICF-constructs ‘activities’ and ‘participation’ and a low correlation between CPC and ‘quality of life’ were expected.

Methods

Participants

In this study potential participants were survivors of an in- or out of hospital cardiac arrest, aged 18 years and older. They had to

Table 2
The ‘Structured CPC’.

	CPC 1	CPC 2	CPC 3	CPC 4	CPC 5
Interaction with environment	X	X	X		
Conscious	X	X	X		
Participate in activities of daily living	X	X	X		
Able to wash and dress independently	X	X			
Able to do the housekeeping	X	X			
Able to spent 24 hours independently	X	X			
Able to work in sheltered environment	X	X			
Able to work as before (if applicable)	X				
Able to do leisure activities as before	X				
EEG activity	X	X	X	X	
Signs of brain death					X

have sufficient knowledge of the Dutch language and had to be able to fill in a questionnaire without help or with a little help from a relative, such as reading the questions or writing down the answer as told by the participant. Additionally, potential participants needed to live in their definite living environment for more than one month.

Procedure

Patient data on potential participants were retrieved from 3 sources:

- (1) The ALASCA database for participants included between April 2009 and December 2010.¹⁴
- (2) The ‘Hart voor Limburg’ registry of people who were admitted to the Maastricht University Medical Centre, The Netherlands, due to a cardiac arrest in the period from April 2011 until June 2012.
- (3) Registry of rehabilitation centre Adelante Centre of Expertise in Rehabilitation Medicine and Audiology, The Netherlands, at the department of acquired brain injury due to a cardiac arrest from January 2007 until June 2012.

Potential participants were sent a questionnaire and an informed consent form by mail. In case of no reaction within 2 weeks, one reminder was sent by mail. After receiving the questionnaire and consent, participants were called to administer the ‘Structured CPC’ interview by phone. In case of incompleteness of the questionnaire, the missing pages were resent to the participant, with a request to fill in the missing pages.

This study was approved by the Medical Ethical Committees of Maastricht University and Adelante Centre of Expertise in Rehabilitation and Audiology

Sample size calculation

Sample size calculation is based on results of the study of Raina et al.¹⁵ For two sided testing with 0.05 and a power of 0.9, 48 participants would be needed with the association of $r = -0.41$ as a reference.

Study parameters

The primary study endpoint was the Cerebral Performance Category (CPC) (Table 1).

For this study we created a format to conduct a semi-structured interview, the ‘Structured CPC’ (for a detailed description see Table 2).

Development of the ‘Structured’ CPC

The ‘Structured CPC’ was created by defining the criteria that differentiate between the CPC scores. All criteria were consecutively introduced in a scheme presenting each CPC score (see for criteria

Download English Version:

<https://daneshyari.com/en/article/3007647>

Download Persian Version:

<https://daneshyari.com/article/3007647>

[Daneshyari.com](https://daneshyari.com)