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CORPUS 1 pilot study: evaluating the impact of physical capacity on the quality of single operator continuous-chest-compression-only cardio pulmonary resuscitation

Submission date
14/01/2010

Registration date
09/02/2010

Last Edited
16/05/2012

Recruitment status
No longer recruiting

Overall study status
Completed

Condition category
Circulatory System

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol
Not provided at time of registration

Contact information

Type(s)
Scientific

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Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
N/A

Study information

Scientific Title
An observational pilot study to evaluate the impact of physical capacity on the quality of single operator continuous-chest-compression-only cardio pulmonary resuscitation

Acronym
CORPUS

Study objectives
Different components of physical fitness (cardiopulmonary exercise capacity and muscle strength) affects the performance of sustained, single-operator, continuous-external-chest-compressions only resuscitation.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Medical Ethical Committee of Jessa Hospital approved on the 2nd October 2008 (ref: 08.53 /cardio08.11)

Study design
Prospective observational pilot study

Primary study design
Observational

Secondary study design
Cohort study

Study setting(s)
Hospital

Study type(s)
Treatment

Participant information sheet
Not available in web format, please use the contact details below to request a patient information sheet

Health condition(s) or problem(s) studied
Critical cardiac care

Interventions
Each subject was instructed to perform sustained, single operator, chest-compression-only cardiocerebral resuscitation (CCR) up to 15 minutes or until exhaustion when the 15-minute CCR session could not be completed. Resuscitation performance was assessed through a special designed laptop based technology (Laerdal PC Skill Reporting System), connected to an adult CCR training manikin (Laerdal, Resusci Anne & Skill Reporter), providing data on compression

compliance, including numerical and graphical summaries. Compressions were recorded as correct if both depth and hand placements were in keeping with the standard 2005 International Consensus on Cardiopulmonary Resuscitation guidelines. Adequate compression depth is defined as appropriate between 38 and 51 mm. Adequate compression rate for adults was at least 100 compressions/minute; CCR quality is defined as the number of compressions with adequate depth within a certain timeframe (expressed as %).

Intervention Type
Other

Phase
Not Applicable

Primary outcome measure
1. Average values of compression rate (ECCs/min) and compression depth (mm), obtained after 1 minute, 3 minutes, and for two consecutive time periods of 5 minutes (5 - 10, 10 - 15)
2. Heart rate during CCR, measured continuously by using a commercial heart rate monitor (Polar, Oy, Finland)
3. Blood lactate levels (mmol/L), measured with capillary blood samples taken at baseline and after 5, 10 and 15 minutes and using an automated lactate analyser

Secondary outcome measures
1. Cardiopulmonary exercise capacity. All subjects performed a maximal cardiopulmonary bicycle exercise test, designed to reach peak oxygen uptake capacity (VO2peak) within 8 - 12 minutes, as executed in previous studies from our laboratory. During the cycling test, an electronically braked Ergo 1500 cycle (ErgoFit, Pirmasens, Germany) was used. The cycling frequency was set at 70 cycles/min and the test was ended when the subject failed to maintain a cycling frequency of at least 60 cycles/min. Both the starting and incremental cycling resistance was set between 30 and 45 Watts, depending on age, height, weight, and gender. The cycling resistance increased every single minute. Before every test, a gas and volume calibration was done automatically. During the tests, environmental temperature was kept stable (20°C). During the exercise tests, pulmonary gas exchange analysis was performed by a cardiopulmonary ergospirometry device (Schiller CS200, Schiller AG, Switzerland). Oxygen uptake capacity (VO2), respiratory exchange ratio (RER), and carbon dioxide output (VCO2) were collected breath-by-breath and averaged every 10 seconds. By plotting exercise VO2 against exercise VCO2, ventilatory threshold was calculated by V-slope method, as executed in previous studies from our laboratory. A software programme of the ergospirometry device determined the break point of the two slopes. Maximal cycling power output (Wpeak) was reported.
2. Muscle strength. Muscle strength measurements of the upper body were performed using a standardised strength testing protocol on an isokinetic dynamometer (Biodex). Following a 5-minute standardised warming-up (Technogym Lat Pull, Pectoral, ArmCurl), subjects were positioned and fixated in a semi supine (15° backward inclination) sitting position (shoulder and thorax fixation). The rotational axis of the dynamometer was aligned with the transverse shoulder/elbow-joint axis and strapped to the distal end of the humerus/radius-ulna. The alignment of the dynamometer was systematically controlled using anatomical reference points. To test upper body strength each subject performed two maximal isometric shoulder flexions, extensions, adductions, abductions, internal and external rotations as well as elbow flexion and extensions (3 seconds) at respective shoulder/elbow angels of 45° and 90° interspersed by 45-second rest intervals. Maximal isometric torque at each angle was calculated as the average of the manually smoothed static torque curves. After a brief rest period upper body muscle fatigue was tested. Subjects performed one bout of 20 maximal isokinetic (180°/S) shoulder flexions,

extensions, adductions, abductions, internal and external rotations and elbow flexions and extensions from 90° to 20° (ROM of 70°). After each contraction the upper/lower arm was returned passively to the 90° point. Muscle fatigue was calculated as the percentage total work decrease from the first three contractions to the last three. All tests were performed unilaterally. Immediately after the muscle strength measurements, the same examiner would ask subjects to perform dominant hand dynamometry (Jamar handgrip dynamometer; Sammons Preston Rolyan, Bolingbrook, IL) two times. Subjects were standing upright with their elbows at 90°.

Overall study start date
01/07/2009

Completion date
01/02/2010

Eligibility

Key inclusion criteria
1. Active healthcare professionals (12 intensive cardiac care nurses, 3 physicians)
2. Between the ages 18 and 65 years, either sex
3. Working at the Jessa Hospital, Hasselt, Belgium
4. Subjects were required to be able to achieve a maximal voluntary cardiopulmonary exercise test

Participant type(s)
Patient

Age group
Adult

Lower age limit
18 Years

Sex
Both

Target number of participants
15

Key exclusion criteria
Any chronic disease

Date of first enrolment
01/07/2009

Date of final enrolment
01/02/2010

Locations

Countries of recruitment
Belgium

Study participating centre
Jessa Hospital
Hasselt
Belgium
3500

Sponsor information

Organisation
Heart Centre Hasselt vzw (Belgium)

Sponsor details
Begeveldstraat
Bilzen
Belgium
3740

Sponsor type
Hospital/treatment centre

Website
http://www.jessazh.be/

ROR
https://ror.org/03tw90478

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Virga Jesse Hospital - Heart Centre Hasselt (Virga Jesse Ziekenhuis - Hart Centrum Hasselt) (Belgium) - provided research grant

Funder Name
Laerdal BeNeLux (Netherlands) - provided logistic support

Results and Publications

Publication and dissemination plan
Not provided at time of registration

Intention to publish date

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/02/2012		Yes	No