Ensihoitolääketieteen opetus ja tutkimushankkeet Pirkanmaalla

Sanna Hoppu
Dos., yl

Anestesiologian ja tehohoidon oppiala

- Professori Arvi Yli-Hankala
  - Anestesiologia: Professori, ylilääkäri Arvi Yli-Hankala
  - Tehohoito: dosentti, ylilääkäri Sari Karlsson
  - Kivunhoito: dosentti, ylilääkäri Maija-Liisa Kalliomäki
  - Ensihoito: dosentti, ylilääkäri Sanna Hoppu

- Kliiniset opettajat: Tuuli Savolainen, Tuomas Huttunen ja Juha Virman (sij Petra Valtonen)

Ensihoitolääketieteen opetus

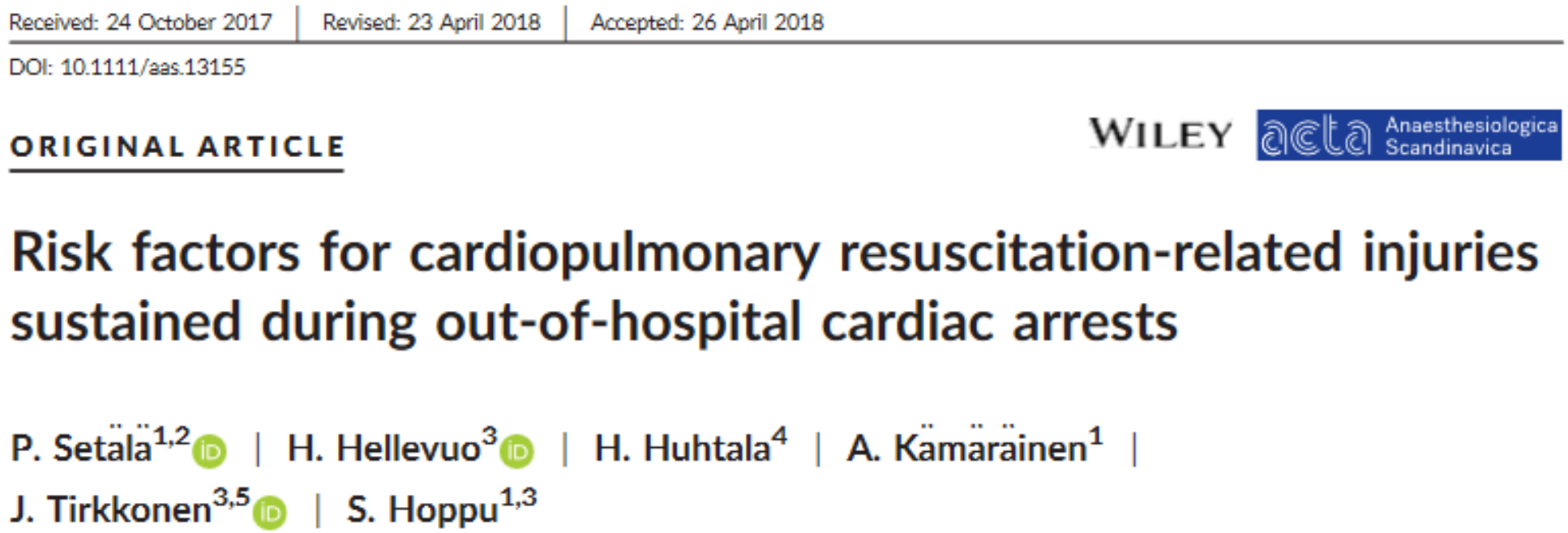
- Perusopetus lääketieteen kandidaateille (6 v)
  - Luennot ja pienryhmäopetukset (leikkaussalipalvelu)
  - Anestesiologian ja tehohoidon loppukuulustelu
- Erikoistumisvaiheen opetus anestesiologiaan ja tehohoitoon erikoistuville lääkäreille (6v)
  - Meetingit, tutustumisjaksot ensihoitoon
  - Tentti
- Ensihoitolääketieteen lisäkoulutusohjelma (2v)
  - Akuuttilääketieteen sekä anestesiologian ja tehohoidon erikoislääkäreille
  - Moduuliopetus, joka kiertää eri yliopistopaikkakunnilla
  - Tentti

Ensihoitolääketieteen tutkimus

- Tutkimusryhmän johtaja: Dos Sanna Hoppu
- LT Joonas Tirkkonen, LT Piritta Setälä
- Käynnissä olevat tutkimushankkeet:
- Väitöskirjaprojektit (10):
- LL Heidi Hellevuo 2020
- LL Marko Sainio 2020
- LL Timo Kontula
- LK Eetu Loisa
- LL Sakari Vähä-Tuisku
- LL Raku Hautamäki
- LL Heidi Kangasniemi 2020
- LL Joonas Tamminen
- LL Jari Kalliomäki
- LL Paula Mäki

Väitöskirja

- Koostuu 4-5 alkuperäisjulkaisusta, jotka on vertaisarvioitu ja julkaistu kansainvälisessä lehdessä (IF) sekä nk väitöskirjan yhteenvedosta, joka julkisesti tarkastetaan väitöstilaisuudessa (esitarkastus on jo tehty).



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ORIGINAL ARTICLE

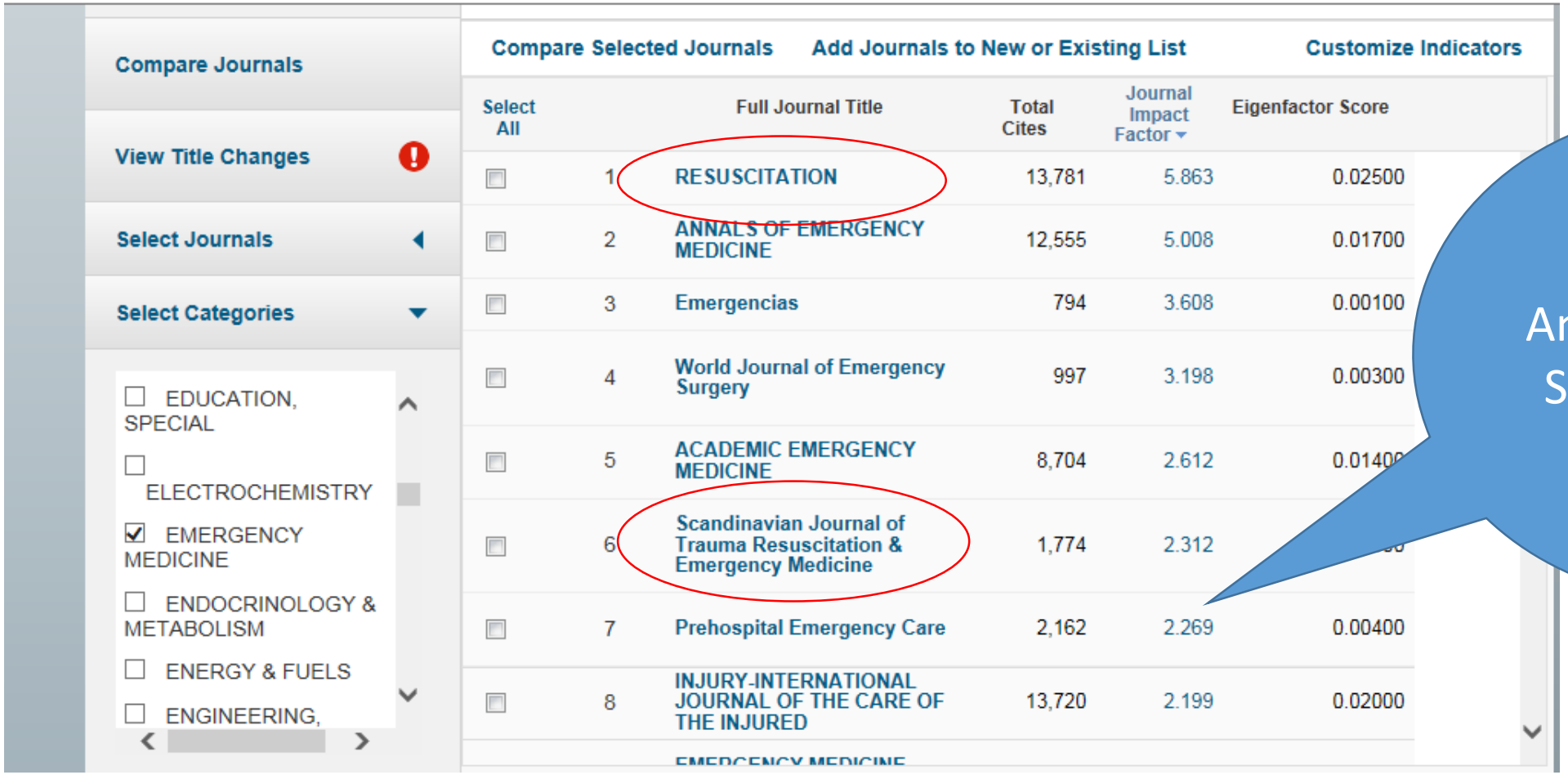
WILEY acta Anaesthesiologica Scandinavica

Risk factors for cardiopulmonary resuscitation-related injuries sustained during out-of-hospital cardiac arrests

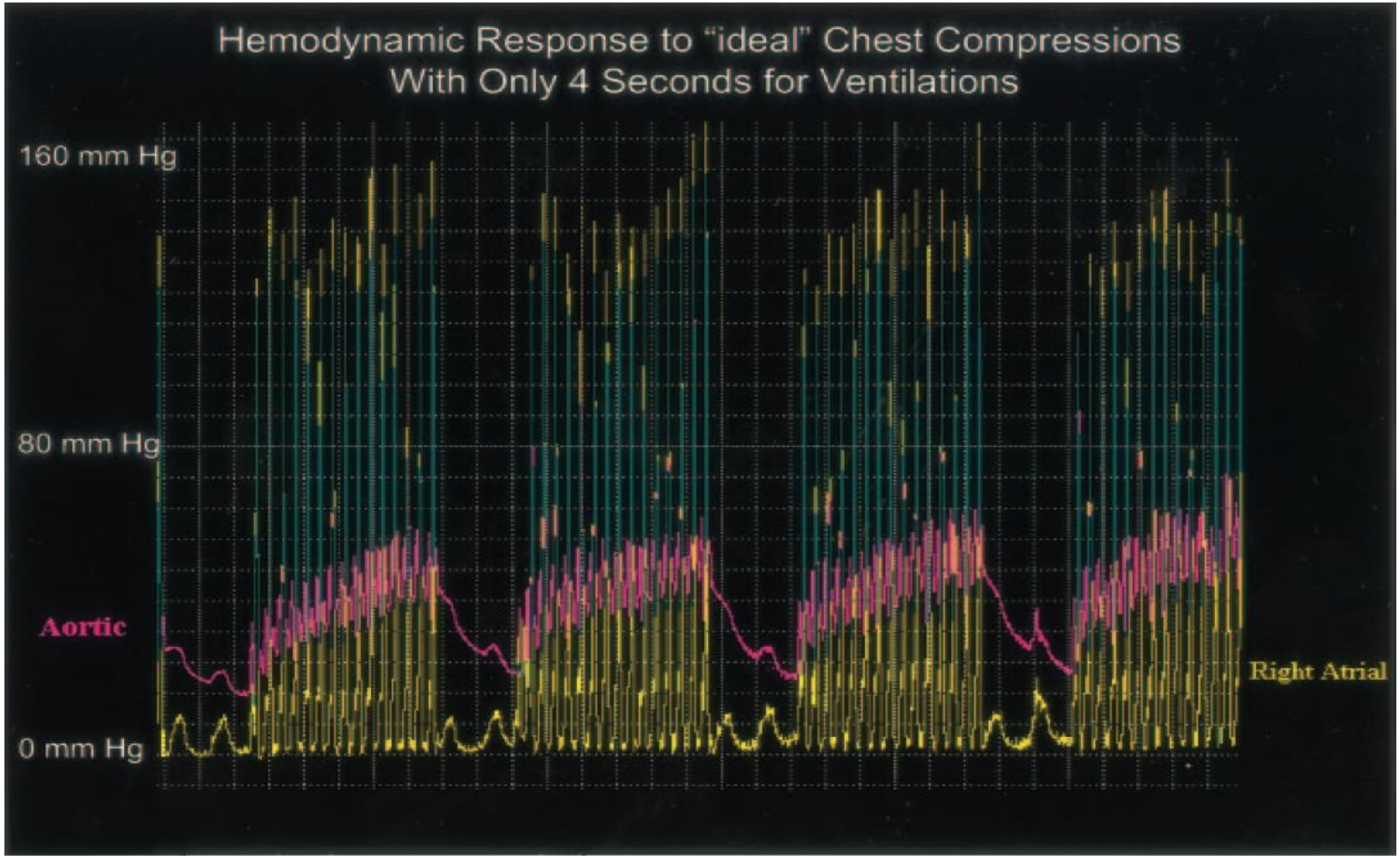
P. Setälä[1,2] | H. Hellevuo[3] | H. Huhtala[4] | A. Kämäräinen[1] | J. Tirkkonen[3,5] | S. Hoppu[1,3]

Osatyöt

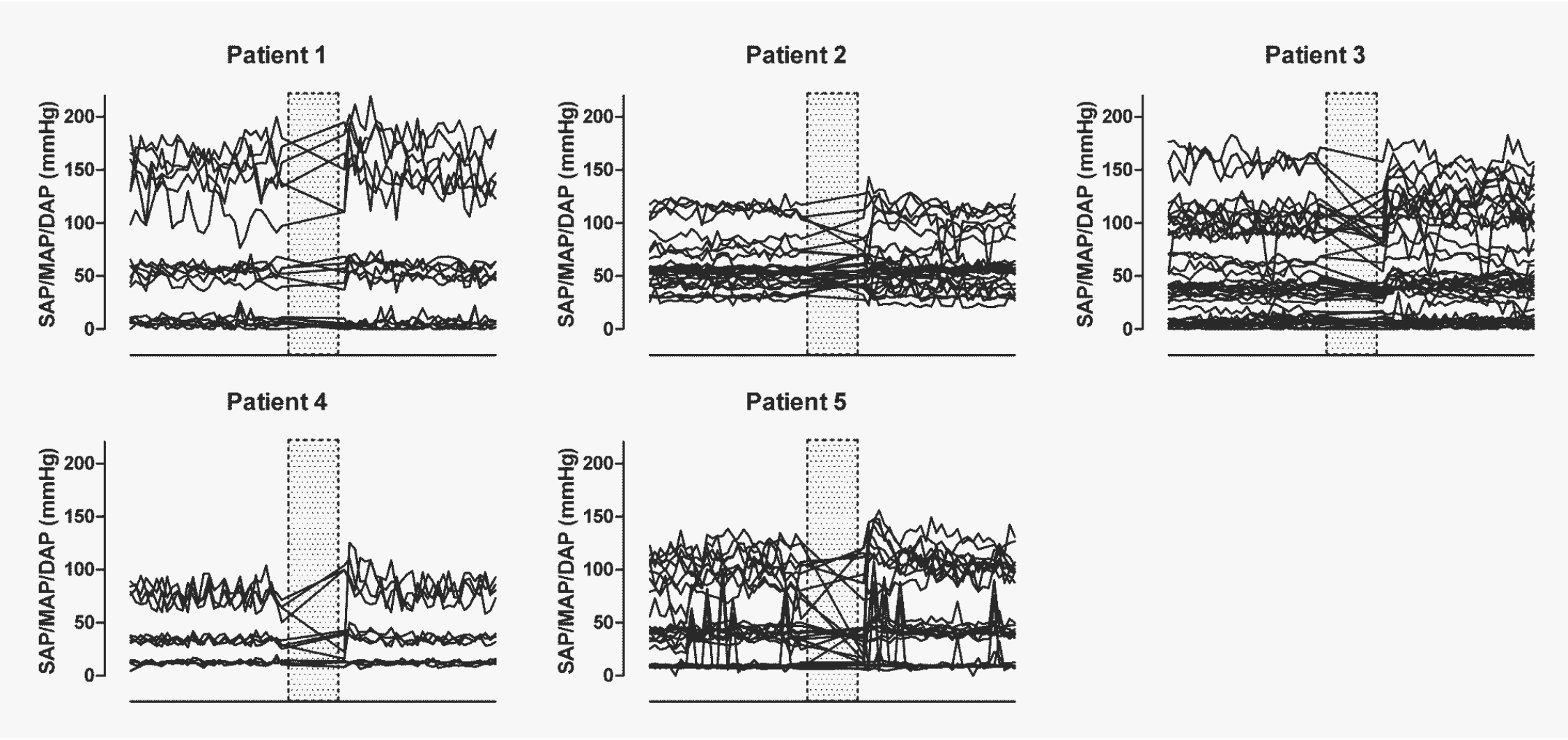
- Julkaistaan mahdollisimman korkean impact factorin omaavassa kansainvälisessä lehdessä



Tampereella tehtyjä merkittävimpiä löydöksiä



Berg et al. ***Circulation*. 2001;104:2465-2470.)**



Hoppu ym. Resuscitation 2011

Ventricular fibrillation/tachycardia, pulseless electrical activity and asystole are equally common initial rhythms in in-hospital cardiac arrest due to cardiac reasons

Results

Aetiology of cardiac arrest	Initial rhythm			
	ASY	PEA	VF/VT	Not reported
Cardiac reason, n=192 (%)	53 (28)	71 (37)	60(31)	8 (4)
Infarct or ischemia, n=135	41	47	44	3
Congestive heart failure , n=21	8	10	2	1
Tamponade, n=9	0	7	2	0
Postoperative arrhytmias , n=11	1	2	8	0
Other, n=16	3	5	4	4
Pneumonia, n=44 (%)	14 (32)	27 (61)	1 (2)	2 (5)
Pulmonary embolism, n=18 (%)	6 (33)	11 (61)	1 (6)	0
Infections, n=28 (%)	16 (57)	7 (25)	3 (11)	2 (7)
Haemorrhage, n=25 (%)	8 (32)	15 (60)	0	2 (8)
Abdominal organ-derived, n=18 (%)	6 (33)	10 (55)	1 (6)	1 (6)
Electrolyte disturbance , n=5 (%)	2 (40)	3 (60)	0	0
Trauma, n=5 (%)	2 (33)	3 (50)	0	1 (17)
Other, n=41 (%)	11 (27)	22 (54)	2 (4)	6 (15)
Aetiology not known, n=7 (%)	3 (43)	3 (43)	0	1 (14)

Hellevuo ym. 2015

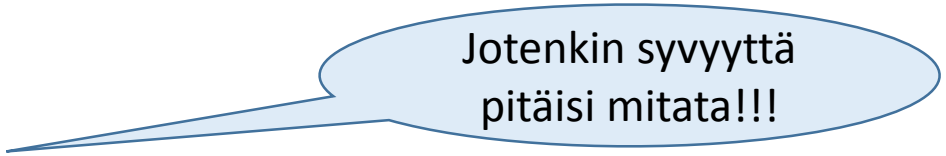
Painantasyvyys ja vammat

- Painantasyvyys lisää elvytysvammoja (p=0.036)

	<50mm	**50-60mm**	**>61mm**	
Injuries	27.5%	27.3%	48.6%	p=0.057

- Maksimaalinen painantasyvyys lisää elvytysvammoja (p=0.003)

	<60mm	**60-70mm**	**70-80mm**	**>80mm**	
Injuries	20%	28%	29,6%	50%	p=0.049



Hellevuo ym. 2012

Public location and male gender but not the duration of resuscitation attempt predict cardiopulmonary resuscitation related injuries in out-of-hospital cardiac arrest

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Purpose of the study

- We determined the frequency and nature of CPR related injuries in OHCA and examined patient and event characteristics in EMS system where patients are not routinely transported to hospital with on-going CPR but instead CPR is performed on the scene.

Materials and methods

- Observational study, data collected prospectively from EMS datasheets and forensic autopsy records between 1.6.2013 – 31.5.2014 in Pirkanmaa, Finland.
- Exclusion criteria: OHCAs due to trauma in the thoracic or abdominal area.
- Data analysed with Chi-square or Mann-Whitney U-test.
- Binary logistic regression analysis applied for ORs to determine predictors for CPR related injuries.
- Statistical significance two-tailed p<0.05.

Results

- Table 1. Injuries related to cardiopulmonary resuscitation in OHCA.

	All patients n=149
Sternum fracture, n (%)	22 (15)
Rib fracture n (%)	64 (43)
bilateral n (%)	51 (34)
unilateral n (%)	6 (4)
≥ 2 fractures n (%)	63 (42)
≥ 4 fractures n (%)	56 (38)
≥ 6 fractures n (%)	47 (32)
≥ 8 fractures n (%)	33 (22)
Number of rib fractures, mean ± SD [min – max]	3.3 ± 4.7 [0 – 24]
Pneumothorax n (%)	0
Hemothorax n (%)	4 (3)
Haematoma – rib fractures n (%)	11 (7)
Lung contusion n (%)	1 (<1)
Mediastinal haematoma n (%)	1 (<1)
Great vessels n (%)	1 (<1)
Haematoma –heart n (%)	11 (7)
Gastric rupture n (%)	1 (<1)
Liver rupture n (%)	1 (<1)
Spleen rupture n (%)	0
Laryngeal haematoma n (%)	2 (1)

- Table 2. OHCA patient characteristics divided into injured and non-injured groups.

	Injuries	No injuries	p-value
n (%)	70 (47)	79 (53)	
Age, mean ± SD [min – max]	70 ± 13.1 [20 – 91]	65 ± 16.8 [0.1 – 94]	0.038
Male, n (%)	56 (80)	45 (57)	0.003
BMI, mean ± SD [min – max]	27.8 ± 5.7 [17.6 – 48.3]	29.1 ± 8.2 [18.7 – 66.9]	0.627
Bystander CPR, n (%) yes no EMS witnessed	39 (56) 19 (27) 12 (17)	31 (39) 31 (39) 17 (22)	0.127
Duration of bystander CPR attempt, min mean ± SD [min – max]	9.0 ± 4.0 [2 – 21}	10.6 ± 6.1 [2 – 29]	0.411
Duration of EMS CPR attempt, min mean ± SD [min – max]	23.0 ± 16.0 [0 – 83]	19.7 ± 12.6 [1 – 70]	0.232
Duration of the overall CPR attempt, min mean ± SD [min – max]	28.1 ± 16.6 [0 – 83]	23.8 ± 12.2 [1 – 74]	0.145
Initial rhythm VF, n (%)	20 (29)	9 (11)	0.008
Initial rhythm PEA, n (%)	23 (33)	16 (20)	0.081
Public location, n (%)	26 (37)	9 (11)	<0.001
Airway management intubation, n (%)	21 (30)	14 (18)	0.078
Any ROSC, n (%)	15 (26)	6 (10)	0.020

- Table 3. Predictors of CPR related injuries in OHCA patients.

	CPR related injuries Univariate			CPR related injuries Multivariable		
	Odds ratio	95% CI	p-value	Odds ratio	95% CI	p-value
Age	1.04	1.00 – 1.07	0.012	1.04	1.01 – 1.07	0.013
Genger	4.14	1.76 – 9.71	0.001	4.11	1.79 – 9.43	0.001
Public location	4.15	1.66 – 10.41	0.002	4.98	2.02 – 12.31	<0.001
Initial rhythm VF	2.04	0.74 – 5.60	0.167	variable not entered		
Any ROSC	1.18	0.42 – 3.28	0.76	variable not entered		
Duration of CPR attempt	1.02	0.99 – 1.05	0.312	variable not entered		

Conclusions

- Public location and male gender, but not the duration of resuscitation attempt predicted CPR related injuries in OHCA.
- Healthcare professionals benefit from an understanding of the nature and frequency of CPR related injuries. This will help them to make better clinical decisions on OHCA patient care and request adequate investigations in situations when diagnosing the cause of death.

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ERC Resuscitation 2016, Reykjavik, September 24-25

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Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Short communication

Effect of mattress and bed frame deflection on real chest compression depth measured with two CPR sensors

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Table 2
Effect of bed and mattress type on chest compression depth. Compression depth was measured taking and not taking the mattress/bed deflection into consideration.

	HB (n = 1464)	ER (n = 7311)	ICU (n = 2093)
Total depth (mm)	66 (11)	68 (9)	59 (6)
Mattress/bed deflection effect (mm)	12.8 (4)	12.4 (4)	14.1 (3)
Real CC depth (mm)	53 (9)	55 (7)	44 (6)
Mattress/bed contribution on CC depth (%)	20 (5)	18 (5)	24 (5)
Proportion of CC's with depth >50 mm (%)	94	98	91
Proportion of CC's with real depth >50 mm (%)	64*	76*	17*

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doi: 10.1111/aas.12245

The quality of manual chest compressions during transport – effect of the mattress assessed by dual accelerometers

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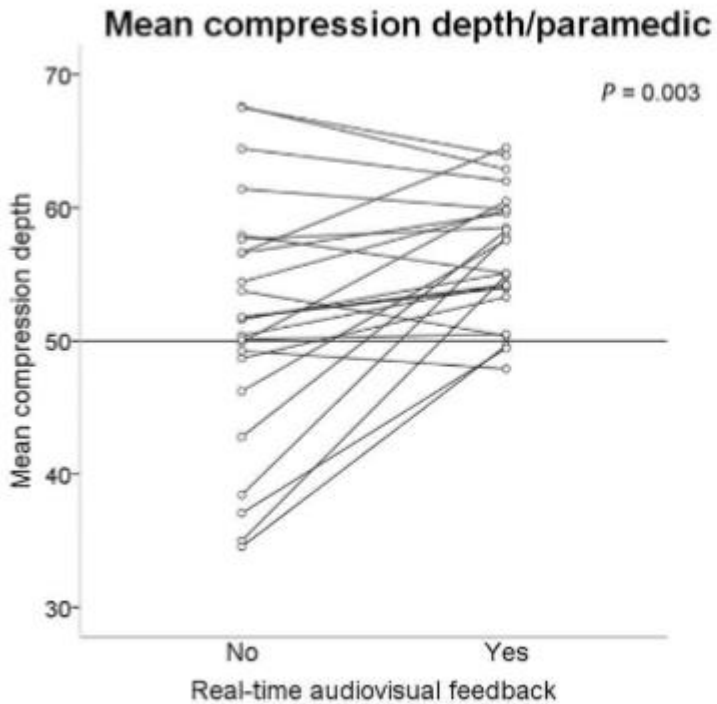

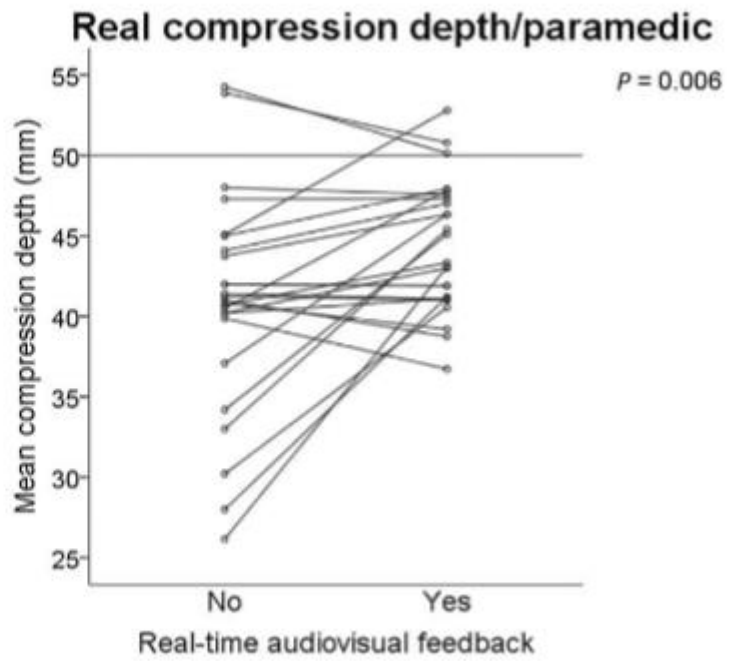

Fig. 2. Real depth, when the mattress and stretcher effect is taken

The National Early Warning score (NEWS) could not predict secondary transportation from primary care to the tertiary hospital in a Finnish prehospital setting.

Kalliomäki J, Kontula T, Kalliomäki M-L, Iso-Aho E, Kämäräinen A, Virkkunen I, Yli-Hankala A, Tirkkonen J, Hoppu S.

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Background

Unnecessary use of ambulances results in the overloading of the Emergency medical services (EMS) and the over-crowding of emergency departments. Medical assessment at the scene by EMS staff may reduce these issues and on the other hand help to recognize the need for the immediate higher level of care of the prehospital patients.

We aimed to determine, whether there is an association between the national early warning scoring (NEWS) measured during the prehospital care and patient transportation and/or admission to the final hospital.

Methods

The data was collected prospectively from all adult patients treated by the EMS and transported to a primary health care during June 2015. The national early warning score (NEWS) was retrospectively calculated based on physiological observations at the scene, and the patients were categorized based on the NEWS. The Chi-square test was used for comparisons between groups. Statistical significance level was set at $p < 0.05$ and two-tailed p-values are reported.

Results

Patients met by Emergency Medical Service (EMS) and grouped by National Early Warning (NEWS) Score. Total n=936 (%)	NEWS 0-4 n=801 (86)	NEWS 5-6 n=66 (7)	NEWS >7 n=69 (7)	P-value
Response codes				
B: 11(1,2)	8(1)	0(0)	3(4)	
C: 508(54)	413(52)	42(64)	53(77)	
D: 417(45)	380(47)	24 (36)	13(19)	p<0.001
Physician consulted by phone n=186 (20)	153(19)	15(23)	18(26)	N/S
Secondary transportation to the tertiary hospital; n=171(18)	147 (17)	14 (22)	10 (14)	N/S
30 d mortality n=41(4,4)	24(3)	8(12)	9(13)	p<0.001
1 year mortality n=154(17)	108(14)	19(29)	27(39)	p<0.001

A total of 40 ambulances participated to the study, and 936 missions were recorded in a month period. The majority were medical patients (82%) with a NEWS 0-4 (86%). The mean age was 69 (19) years. The median NEWS was 1. In a follow-up 18% of those transported to the primary health care were immediately transported to the tertiary hospital.

Results

For 86% of the patients, NEWS was 0-4 and the 30-day mortality was 3%. NEWS 5-6 and over 7 were observed for 7% and 7% of the patients, with a 30-day mortality of 12% and 13% ($p<0.001$). The 1 -year mortality was 17% in this cohort. Patients having the NEWS 0-4, the 1-year mortality was 14%. For those with NEWS 5-6 or over 7 the hospital mortality was 29% and 39%, respectively ($p<0.001$).

Conclusions

Most patients were transported to appropriate level of care evaluated by NEWS. The NEWS could not predict the transport to a secondary hospital.

A surprise was that even with high NEWS score there were patients transported to the primary care, and only 14% of them further transport to the tertiary hospital.

FinnHEMS

ERC Conference, Reykjavik, Iceland 2016

Spontaneous trigger words associated with out-of-hospital cardiac arrest: a descriptive pilot study of emergency calls

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Medical School, University of Tampere and Emergency Medical Service, Tampere University Hospital, Finland

Purpose of the study

According to the International Liaison Committee on Resuscitation (ILCOR), key words used by callers that are associated with cardiac arrest constitute a scientific knowledge gap.[1] Identifying spontaneous trigger words at the beginning of an emergency call may reduce time to dispatch emergency medical services and to initiate bystander resuscitation.

Materials and methods

- Observational study in a Finnish district covering 510 000 inhabitants
- Data included all audio recordings and mission reports of emergency calls of suspected out-of-hospital cardiac arrest or confirmed sudden deaths between January 1 and May 31, 2017
- We excluded cases with unwitnessed cardiac arrest or traumatic death and institutional resuscitation attempts
- Spontaneous trigger words were stratified into true cardiac arrest and non-cardiac arrest groups
- The association between the trigger words and confirmed true cardiac arrests was assessed with a univariate logistic regression model

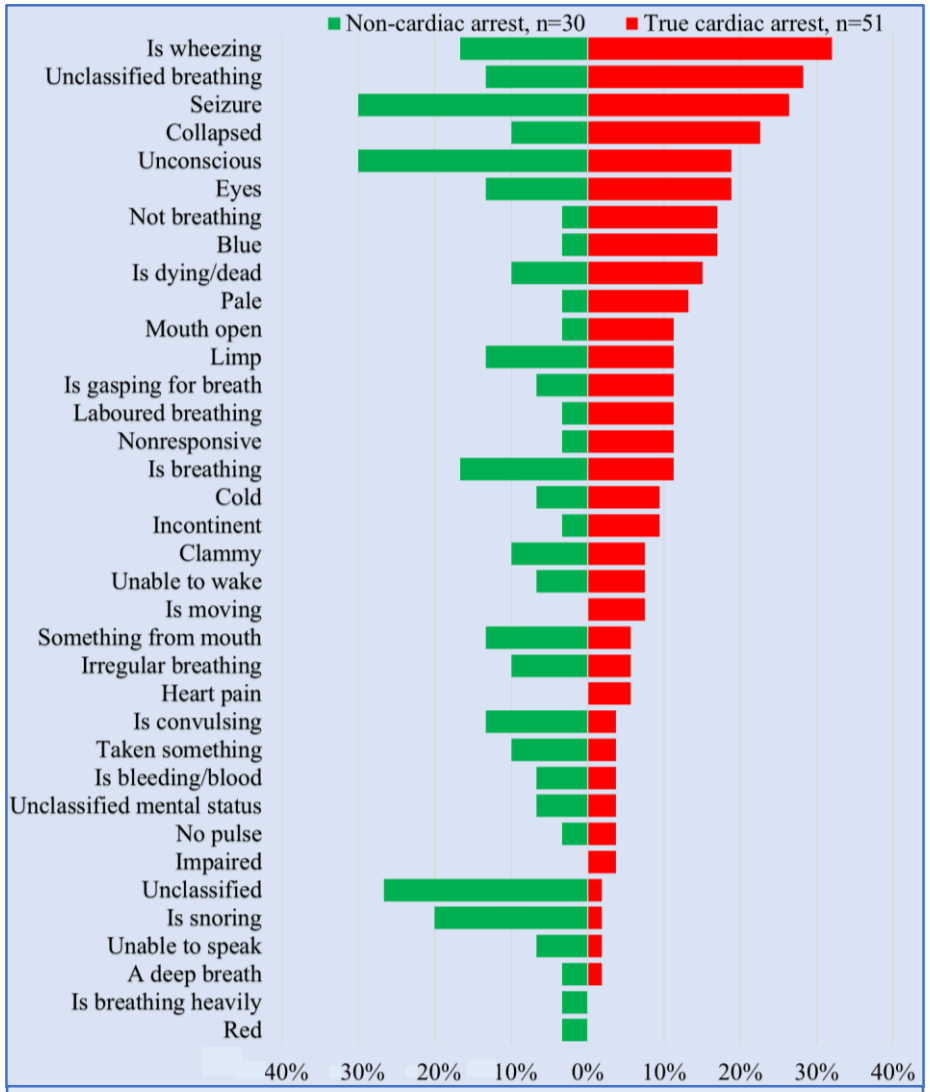

Figure 1. 294 spontaneous trigger words in 81 suspected out-of-hospital cardiac arrests.

Results

Table 1. Spontaneous trigger words in true cardiac arrest and non-cardiac arrest groups.

	True		False		Odds ratio with 95% confidence interval
Trigger word	n	%	n	%	
Is wheezing	17	33	5	17	2.50 (0.81–7.68)
Collapsed	12	23	3	10	2.77 (0.71–10.8)
Not breathing	9	17	1	3	6.21 (0.75–51.7)
Blue	9	17	1	3	6.21 (0.75–51.7)
Pale	7	14	1	3	4.61 (0.54–39.5)
Is snoring	1	2	6	21	0.08 (0.009–0.70)

Conclusion

We observed heterogeneous, surprisingly various descriptions of agonal breathing in Finnish language.

References

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ERC Resuscitation 2018, Bologna, September 20.–22.

EHK:n ”hall of fame”

- Kansainvälisiä julkaisuja kaikkiaan n. 100
- Käynnissä olevia osatyöprojekteja n. 30
  - Paula Mäki datankeräys alkaa keväällä/kesällä 2020