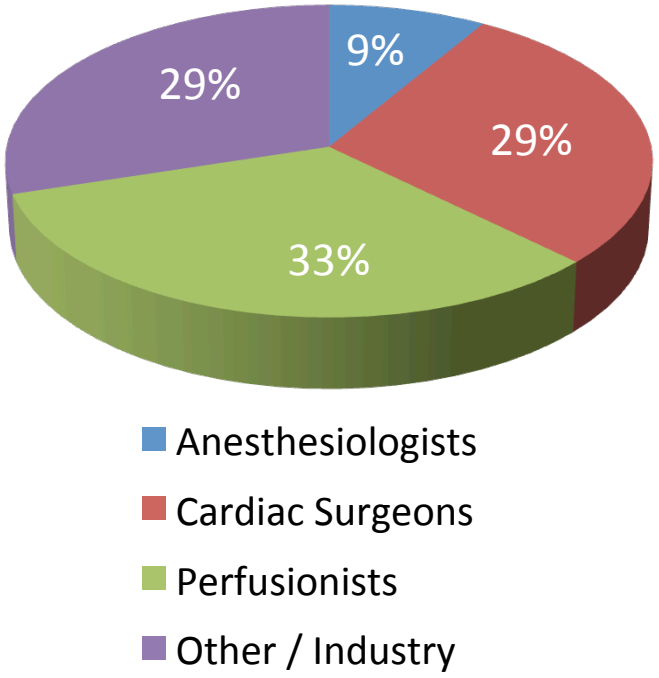
Kyriakos Anastasiadis
Executive Board MiECTiS

MiECTiS

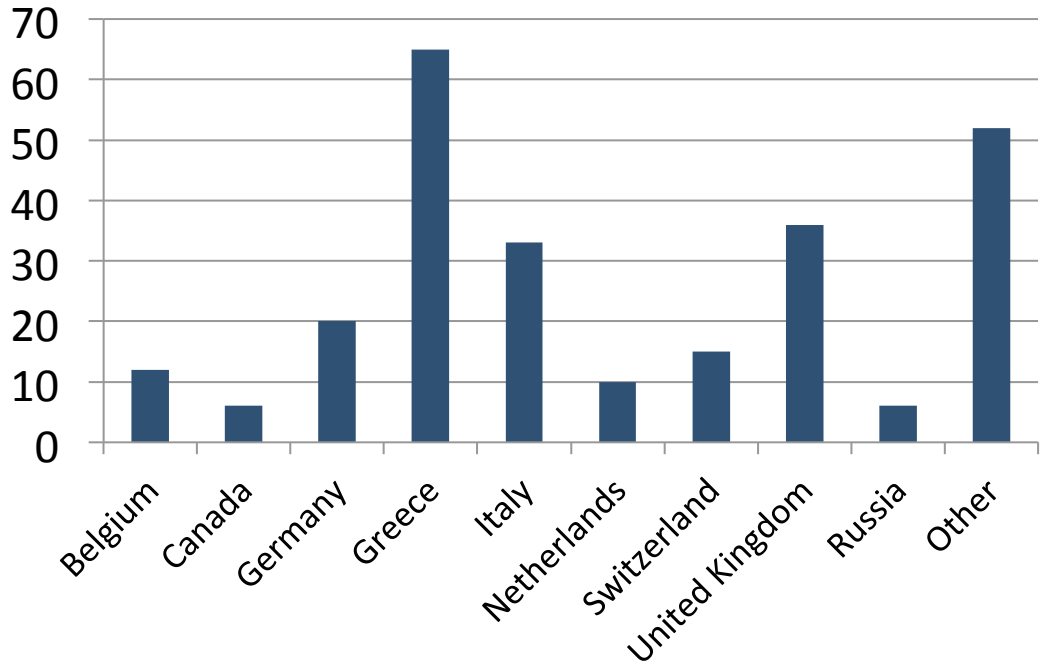
- June 2014: 120 Founding Members
- June 2017: **255 Members**

Members Profession



Country

29 Countries



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Use of minimal invasive extracorporeal circulation in cardiac surgery: principles, definitions and potential benefits. A position paper from the Minimal invasive Extra-Corporeal Technologies international Society (MiECTiS)

Kyriakos Anastasiadis[a], John Murkin[b], Polychronis Antonitsis[a], Adrian Bauer[c], Marco Ranucci[d], Erich Gygax[e], Jan Schaarschmidt[c], Yves Fromes[f], Alois Philipp[g], Balthasar Eberle[h], Prakash Punjabi[i], Helena Argiriadou[a], Alexander Kadner[e], Hansjoerg Jenni[e], Guenter Albrecht[j], Wim van Boven[k], Andreas Liebold[j], Fillip de Somer[l], Harald Hausmann[c], Apostolos Deliopoulos[a], Aschraf El-Essawi[m], Valerio Mazzei[n], Fausto Biancari[o], Adam Fernandez[p], Patrick Weerwind[q], Thomas Puehler[r], Cyril Serrick[s], Frans Waanders[t], Serdar Gunaydin[u], Sunil Ohri[v], Jan Gummert[r], Gianni Angelini[i,w], Volkmar Falk[x] and Thierry Carrel[e,*]

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35 authors

24 departments

Experts Consensus Meeting, Bern, December 2014

MiECTiS

DEFINITION

Terminology

- miniaturized extraorporeal circulation (MECC)
- mini extraorporeal circulation (mECC)
- minimized extracorporeal circulation
- mini cardiopulmonary bypass (mCPB, mini-CPB)
- minimal invasive cardiopulmonary bypass (MICPB)
- miniaturized cardiopulmonary bypass (MCPB)
- venoarterial extracorporeal membrane oxygenation
- minimized perfusion circuit
- minimized extracorporeal life support system
- minimized cardiopulmonary bypass
- minimal invasive extracorporeal circulation

not mini

MINIMAL INVASIVE

MiECC

MiECTiS

In order to be characterized as MiECC

the main components of the system must include:

- a closed CPB circuit
- biologically inert blood contact surfaces
- reduced priming volume
- a centrifugal pump
- a membrane oxygenator
- a heat exchanger
- a cardioplegia system
- a venous bubble trap / venous air removing device
- a shed blood management system

additional components to be integrated into system are:

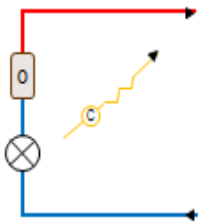
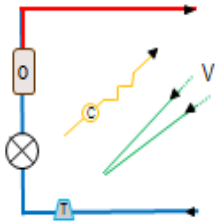
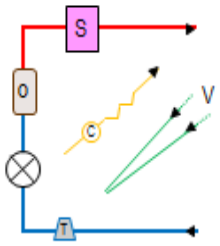
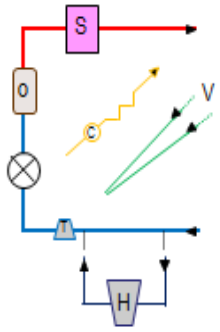
- pulmonary artery vent
- aortic root vent
- pulmonary vein vent
- soft bag / soft-shell reservoir
- hard-shell reservoir (modular systems)
- regulated smart suction device
- arterial line filtration

Minimal invasive ExtraCorporeal Circulation

MiECC

evolution

MiECC

type I		standard	This closed circuit comprises of an afferent tube (blue line) which drains blood from the right atrium to the pump (⊗), then to the oxygenator (O) and returns it to the arterial circulation with the efferent tube (red line). The oblique arrow indicates cardiopledgia line with its pump (©).
type II		air handling	A venous bubble trap/air removing device (T)is added to the standard MiECC circuit so as to facilitate air handling and avoid air entrainment to the venous line. Venting (green) lines (V) drain blood from the aortic root and/or pulmonary artery/vein.
type III		volume management	A soft shell reservoir (S) is added to the circuit to collect blood volume from the patient and return it back during perfusion according to the needs.
type IV		blood management	A hard shell reservoir (H) is added as an extra component integrated to the venous line, so as to convert the system to an open circuit that could facilitate blood management as well as overcome any other intraoperative issue (modular configuration).

Anastasiadis et al; Perfusion 2015;30:195-200.

Minimal invasive ExtraCorporeal Circulation

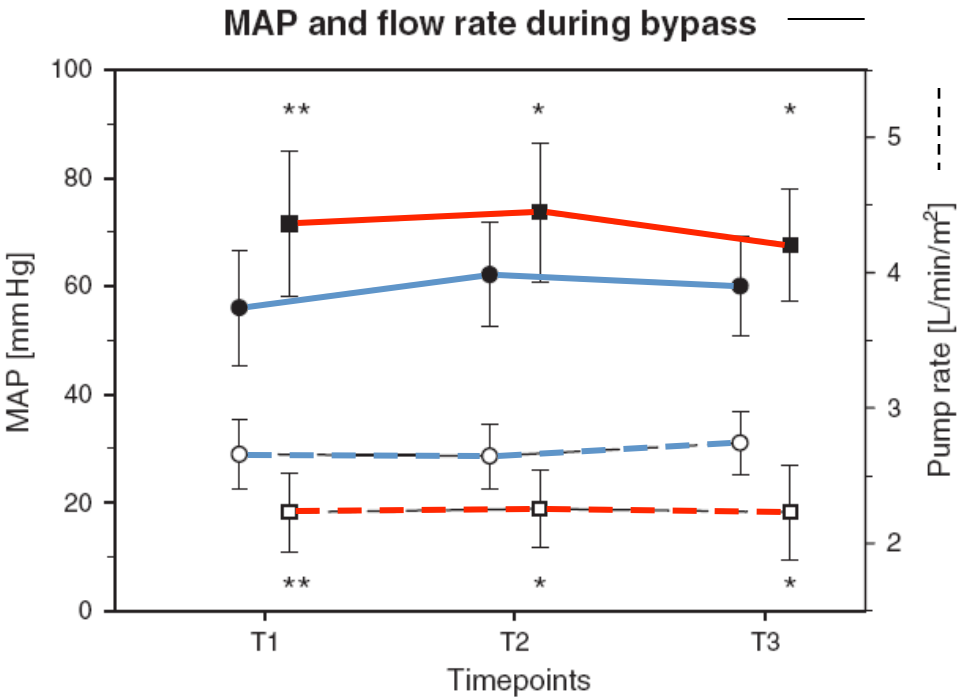
MiECC

rationale

Artificial Organs
28(12):1082–1088, Blackwell Publishing, Inc.

Four Years' Experience With a Miniaturized Extracorporeal Circulation System and Its Influence on Clinical Outcome

*Christoph Wiesenack, †Andreas Liebold, ‡Alois Philipp, *Markus Ritzka,
*Joachim Koppenberg, ‡Dietrich E. Birnbaum, and §Cornelius Keyl



cCPB

MiECC

*$p < 0.05$

T1 = following cardioplegia
T2 = in the middle of bypass time
T3 = end of aortic cross clamping time

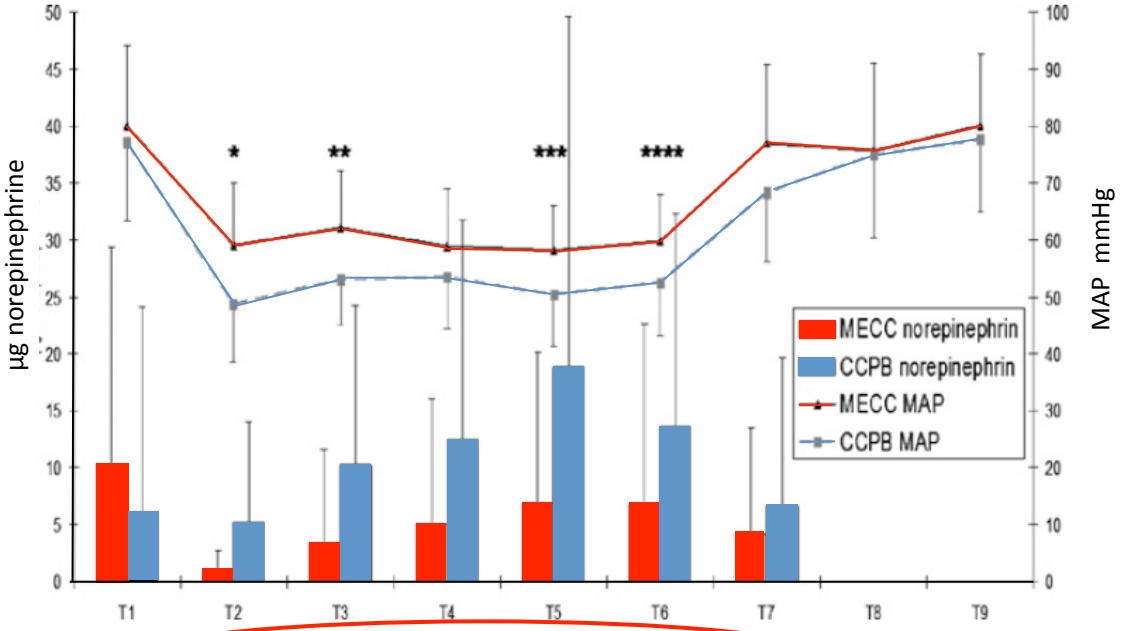
JECT. 2010;42:30–39
The Journal of ExtraCorporeal Technology

Original Articles

Evaluation of Hemodynamic and Regional Tissue Perfusion Effects of Minimized Extracorporeal Circulation (MECC®)

Adrian Bauer, ECCP, MCVT;* Claudius Diez, MD, PhD;† Jens Schubel, MD, PhD;‡
Nagi El-Shouki, MD, PhD;‡ Dietrich Metz, MD;‡ T. Eberle, MD, PhD;§ Harald Hausmann, MD, PhD‡

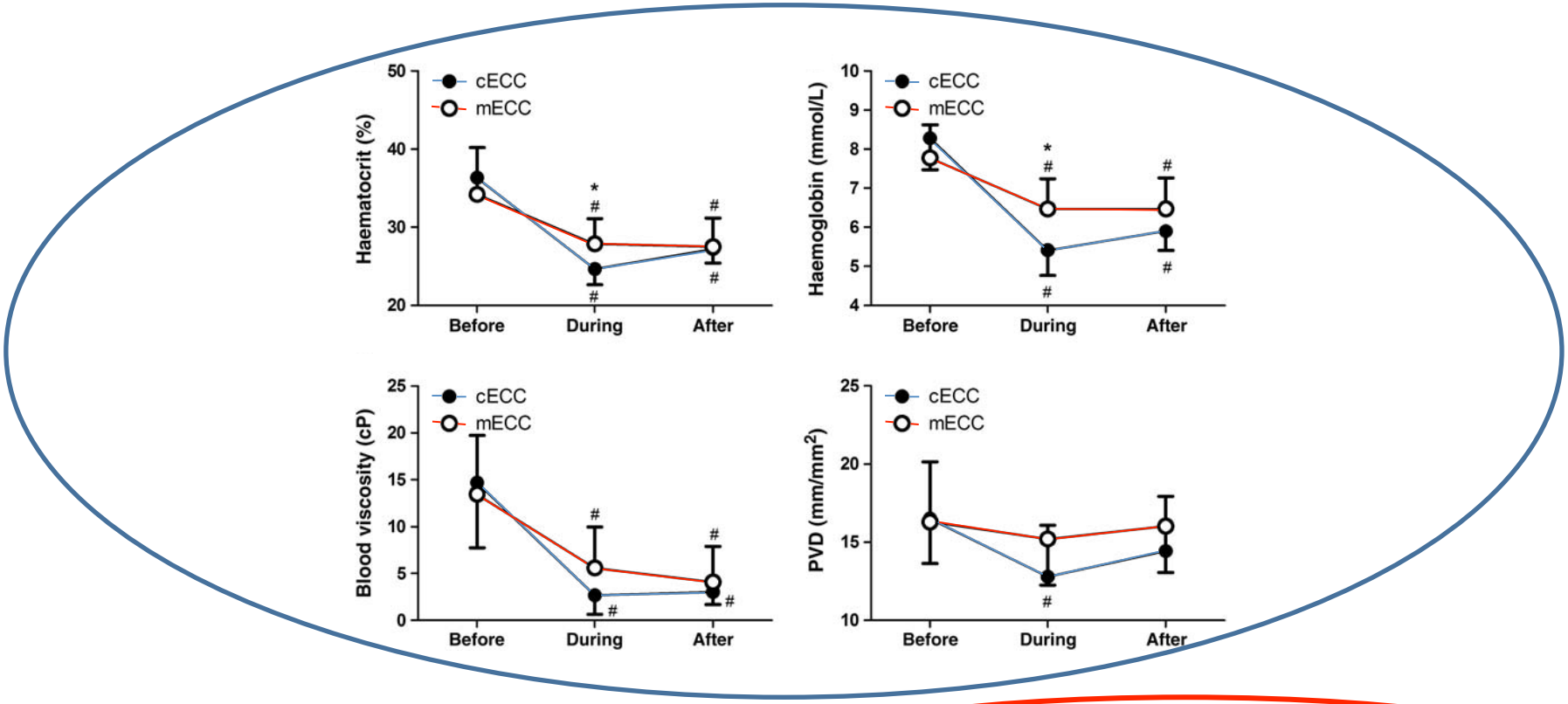
*Department of Cardiovascular Technology, MediClin Heart Centre Coswig, Sachsen Anhalt, Germany;
†Department of Cardiothoracic and Vascular Surgery, University Hospital of Regensburg, Regensburg, Germany;
‡Department of Cardiovascular Surgery, MediClin Heart Centre Coswig, Sachsen Anhalt, Germany; and
§Department of Cardio - Anesthesiology, MediClin Heart Centre Coswig, Sachsen Anhalt, Germany



MAP and norepinephrine consumption. Data are shown as mean ± SD (*p = .002; **p = .01; ***p = .015; ****p = .021). T1: preCPB; T2: after start of CPB; T3: after cardioplegia; T4: 15 minutes after cardioplegia; T5: after X-clamp opening; T6: before termination of CPB; T7: 15 minutes after CPB; T8: 1 hour after CPB; T9: 4 hours after CPB.

The effects of conventional extracorporeal circulation versus miniaturized extracorporeal circulation on microcirculation during cardiopulmonary bypass-assisted coronary artery bypass graft surgery

Koray Yuruk[a,b], Rick Bezemer[a,*], Mariska Euser[a], Dan M.J. Milstein[a], Hilde H.R. de Geus[c], Evert W. Scholten[b], Bas A.J.M. de Mol[b] and Can Ince[a]

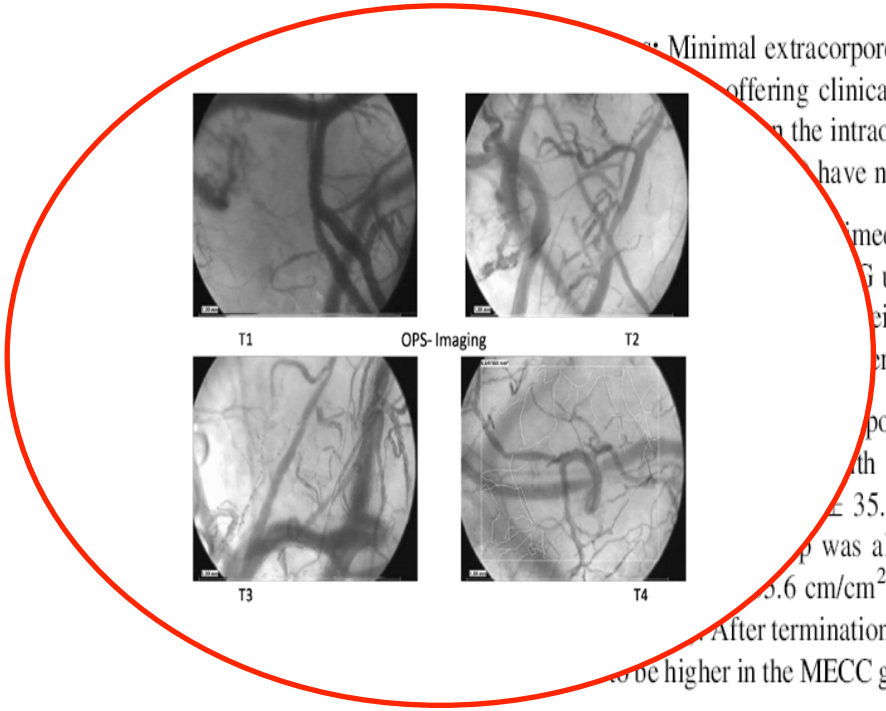


CONCLUSIONS: The results from this relatively small study suggest that the use of the miniaturized extracorporeal circulation system is associated with a statistically significant (but clinically insignificant) reduction in haemodilution and microcirculatory hypoperfusion compared with the use of the conventional extracorporeal circulation system.

Interactive CardioVascular and Thoracic Surgery 15 (2012) 364–370

Comparing microvascular alterations during minimal extracorporeal circulation and conventional cardiopulmonary bypass in coronary artery bypass graft surgery: A prospective, randomized study

Peter Donndorf, MD,[a] Franziska Kühn, MD,[a] Brigitte Vollmar, MD, PhD,[b] Jan Rösner, MD, PhD,[c] Andreas Liebold, MD, PhD,[d] Philipp Gierer, MD, PhD,[e] Gustav Steinhoff, MD, PhD,[a] and Alexander Kaminski, MD, PhD[a]



: Minimal extracorporeal circulation (MECC) has been introduced in coronary artery bypass graft offering clinical benefits owing to reduced hemodilution and no blood–air interface. Yet, the intraoperative microvascular perfusion in comparison with conventional extracor- have not been studied so far.

med to analyze alterations in microvascular perfusion at 4 predefined time points G using orthogonal polarization spectral imaging. Forty patients were random- either MECC or CECC. Changes in functional capillary density (FCD), blood r were analyzed by a blinded investigator.

poreal circulation (ECC) and aortic crossclamping (T2), both groups showed th a significantly higher FCD in the MECC group (206.8 ± 33.6 cm/cm^2 in ± 35.3 cm/cm^2 in MECC group; $P = .034$). In the late phase of the ECC (T3), was already recovered, whereas FCD in the CECC group was still significantly .6 cm/cm^2 in MECC group; $P = .100$ vs T1; 211.1 ± 36.9 cm/cm^2 in CECC group; After termination of ECC (T4), FCD recovered in both groups to baseline. Blood flow velocity be higher in the MECC group, with a significant intergroup difference after aortic crossclamping (T2).

Conclusions: Orthogonal polarization spectral imaging data reveal an impairment of microvascular perfusion during on-pump CABG. Changes in FCD indicate a faster recovery of the microvascular perfusion in MECC during the reperfusion period. Beneficial recovery of microvascular organ perfusion could partly explain the perioperative advantages reported for MECC.

J Thorac Cardiovasc Surg 2012;144:677-683.

Minimal invasive ExtraCorporeal Circulation

MiECC

evidence

Use of minimal invasive extracorporeal circulation in cardiac surgery: principles, definitions and potential benefits. A position paper from the Minimal invasive Extra-Corporeal Technologies international Society (MiECTiS)

Kyriakos Anastasiadis[a], John Murkin[b], Polychronis Antonitsis[a], Adrian Bauer[c], Marco Ranucci[d], Erich Gygax[e], Jan Schaarschmidt[c], Yves Fromes[f], Alois Philipp[g], Balthasar Eberle[h], Prakash Punjabi[i], Helena Argiriadou[a], Alexander Kadner[e], Hansjoerg Jenni[e], Guenter Albrecht[j], Wim van Boven[k], Andreas Liebold[j], Fillip de Somer[l], Harald Hausmann[c], Apostolos Deliopoulos[a], Aschraf El-Essawi[m], Valerio Mazzei[n], Fausto Biancari[o], Adam Fernandez[p], Patrick Weerwind[q], Thomas Puehler[r], Cyril Serrick[s], Frans Waanders[t], Serdar Gunaydin[u], Sunil Ohri[v], Jan Gummert[r], Gianni Angelini[i,w], Volkmar Falk[x] and Thierry Carrel[e,*]

Recommendation	Level of evidence
Class I	
MiECC systems reduce haemodilution and better preserve haematocrit as well as reduce postoperative bleeding and the need for RBC transfusion	A
MiECC systems reduce the incidence of postoperative atrial fibrillation	A
MiECC systems preserve renal function	A
MiECC is associated with improved myocardial protection	A
Class IIA	
Inflammatory response assessed by specific inflammatory markers is attenuated with use of MiECC	B
MiECC systems can reduce cerebral gaseous microembolism and preserve neurocognitive function	B
MiECC exerts a subclinical protective effect on end-organ function (lung, liver, intestine) which is related to enhanced recovery of microvascular organ perfusion	B
Class IIB	
Within a MiECC strategy, less thrombin generation may permit reduced heparin dose targeted to shorter ACT times. When such a strategy is followed, individual heparin dose should be determined using heparin dose–response monitoring systems	B
MiECC appears to offer survival benefit in terms of lower 30-day mortality after CABG procedures	B
The use of short-acting opioids in combination with propofol or volatile anaesthetics, and hypnotic effect monitoring by processed EEG, is recommended for induction and maintenance of anaesthesia for MiECC-based surgery. TOE findings pertinent to institutional management of MiECC should be communicated during the preoperative surgical safety time out	C

Interactive CardioVascular and Thoracic Surgery (2016) 1–16

Use of minimal extracorporeal circulation improves outcome after heart surgery; a systematic review and meta-analysis of randomized controlled trials

Kyriakos Anastasiadis [a], Polychronis Antonitsis [a,*], Anna-Bettina Haidich [b], Helena Argiriadou [a], Apostolos Deliopoulos [a], Christos Papakonstantinou [a]

Author	Year	Procedure	MECC	Control
Anastasiadis [62]	2010	CABG	50	49
Bauer [63]	2010	CABG	18	22
El-Essawi [64]	2010	CABG ± AVR / AVR	146	145
Gunaydin [65]	2009	CABG	20	20
Kutschka [66]	2009	CABG ± AVR/ aortic root	85	85
Castiglioni [67]	2009	AVR	60	60
Sakwa [68]	2009	CABG	102	97
Camboni [69]	2009	CABG	50	40
Formica [70]	2009	CABG	30	30
Ohata [71]	2008	CABG	34	64
Schöttler [72]	2008	CABG	30	30
Kofidis [73]	2008	CABG	50	30
Mazzei [74]	2007	CABG	150	150
Valtonen [75]	2007	CABG	20	20
Huybregts [76]	2007	CABG	25	24
Perthel [77]	2007	CABG	30	30
Skrabal [78]	2007	CABG	30	30
Beghi [79]	2006	CABG	30	30
Bical [80]	2006	AVR	20	20
Remadi [81]	2006	CABG	200	200
Abdel-Rahman [82]	2005	CABG	101	103
Remadi [83]	2004	AVR	50	50
Fromes [84]	2002	CABG	30	30
Abdel Aal [85]	2010	CABG	40	40
Ovcina [86]	2009	CABG	144	144
Zeitani [87]	2009	CABG	20	20

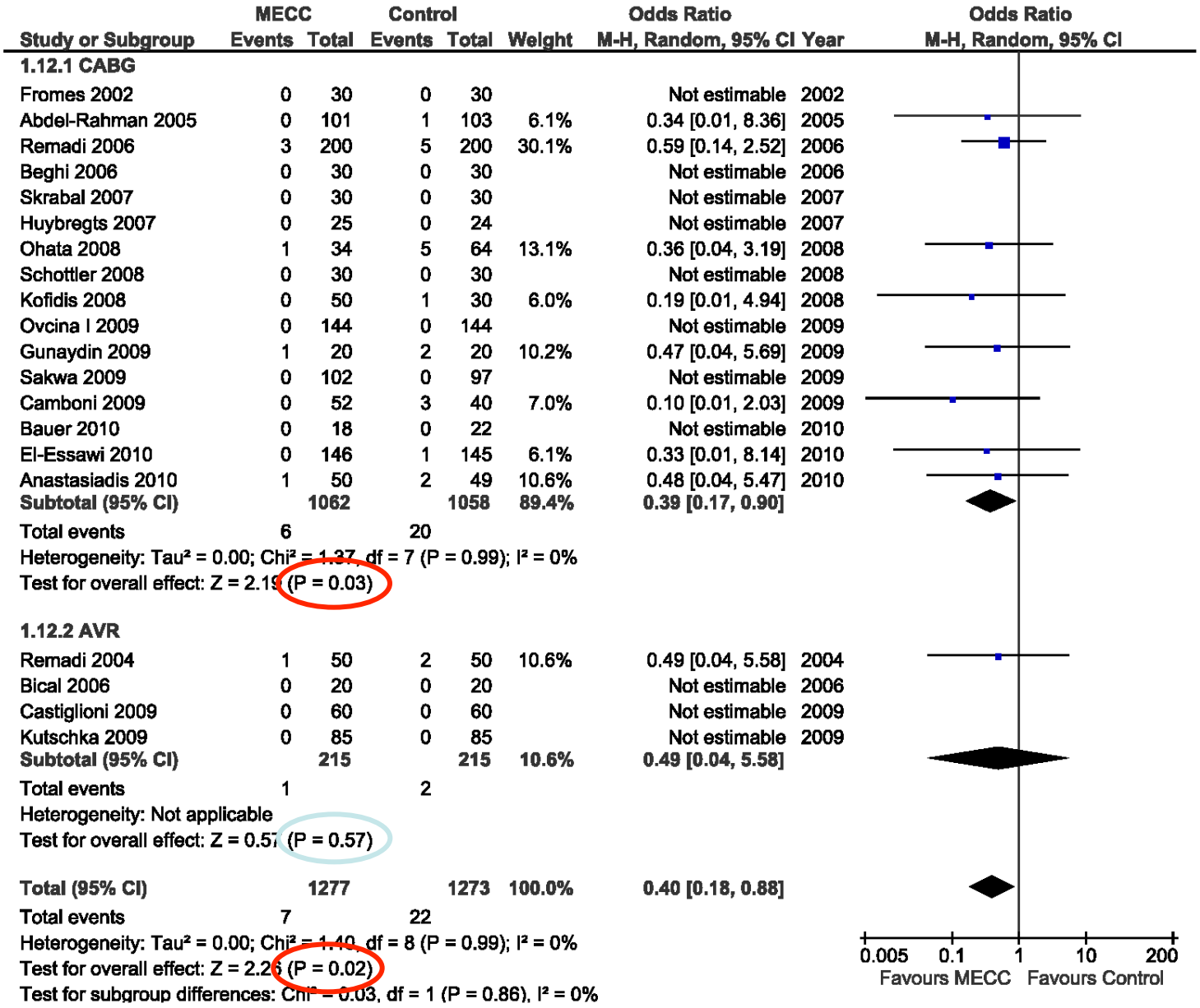
1387 1383 patients

- mortality
- Ht
- PLT
- blood loss
- transfusion
- PMI
- myocardial protection
- inotropic support
- ARF
- arrhythmias
- mechanical ventilation
- ICU stay

Conclusions: Use of MECC in heart surgery resulted in improved short-term outcome as reflected by reduced mortality and morbidity compared with conventional extracorporeal circulation.

Int J Cardiol 2013;164:158-69.

OVERALL MORTALITY



Study or Subgroup	MECC Events	MECC Total	Control Events	Control Total	Weight	Odds Ratio M-H, Random, 95% CI	Year
1.12.1 CABG							
Fromes 2002	0	30	0	30		Not estimable	2002
Abdel-Rahman 2005	0	101	1	103	6.1%	0.34 [0.01, 8.36]	2005
Remadi 2006	3	200	5	200	30.1%	0.59 [0.14, 2.52]	2006
Beghi 2006	0	30	0	30		Not estimable	2006
Skrabal 2007	0	30	0	30		Not estimable	2007
Huybregts 2007	0	25	0	24		Not estimable	2007
Ohata 2008	1	34	5	64	13.1%	0.36 [0.04, 3.19]	2008
Schottler 2008	0	30	0	30		Not estimable	2008
Kofidis 2008	0	50	1	30	6.0%	0.19 [0.01, 4.94]	2008
Ovcina I 2009	0	144	0	144		Not estimable	2009
Gunaydin 2009	1	20	2	20	10.2%	0.47 [0.04, 5.69]	2009
Sakwa 2009	0	102	0	97		Not estimable	2009
Camboni 2009	0	52	3	40	7.0%	0.10 [0.01, 2.03]	2009
Bauer 2010	0	18	0	22		Not estimable	2010
El-Essawi 2010	0	146	1	145	6.1%	0.33 [0.01, 8.14]	2010
Anastasiadis 2010	1	50	2	49	10.6%	0.48 [0.04, 5.47]	2010
Subtotal (95% CI)		**1062**		**1058**	**89.4%**	**0.39 [0.17, 0.90]**	
Total events	6		20				
Heterogeneity: Tau² = 0.00; Chi² = 1.37, df = 7 (P = 0.99); I² = 0%							
Test for overall effect: Z = 2.19 (P = 0.03)							
1.12.2 AVR							
Remadi 2004	1	50	2	50	10.6%	0.49 [0.04, 5.58]	2004
Bical 2006	0	20	0	20		Not estimable	2006
Castiglioni 2009	0	60	0	60		Not estimable	2009
Kutschka 2009	0	85	0	85		Not estimable	2009
Subtotal (95% CI)		**215**		**215**	**10.6%**	**0.49 [0.04, 5.58]**	
Total events	1		2				
Heterogeneity: Not applicable							
Test for overall effect: Z = 0.57 (P = 0.57)							
Total (95% CI)		**1277**		**1273**	**100.0%**	**0.40 [0.18, 0.88]**	
Total events	7		22				
Heterogeneity: Tau² = 0.00; Chi² = 1.40, df = 8 (P = 0.99); I² = 0%							
Test for overall effect: Z = 2.26 (P = 0.02)							
Test for subgroup differences: Chi² = 0.03, df = 1 (P = 0.86), I² = 0%							

Odds Ratio M-H, Random, 95% CI

0.005 0.1 1 10 200

Favours MECC Favours Control

Anastasiadis et al; Int J Cardiol 2013;164:158-69.

Minimal invasive ExtraCorporeal Circulation

MiECC

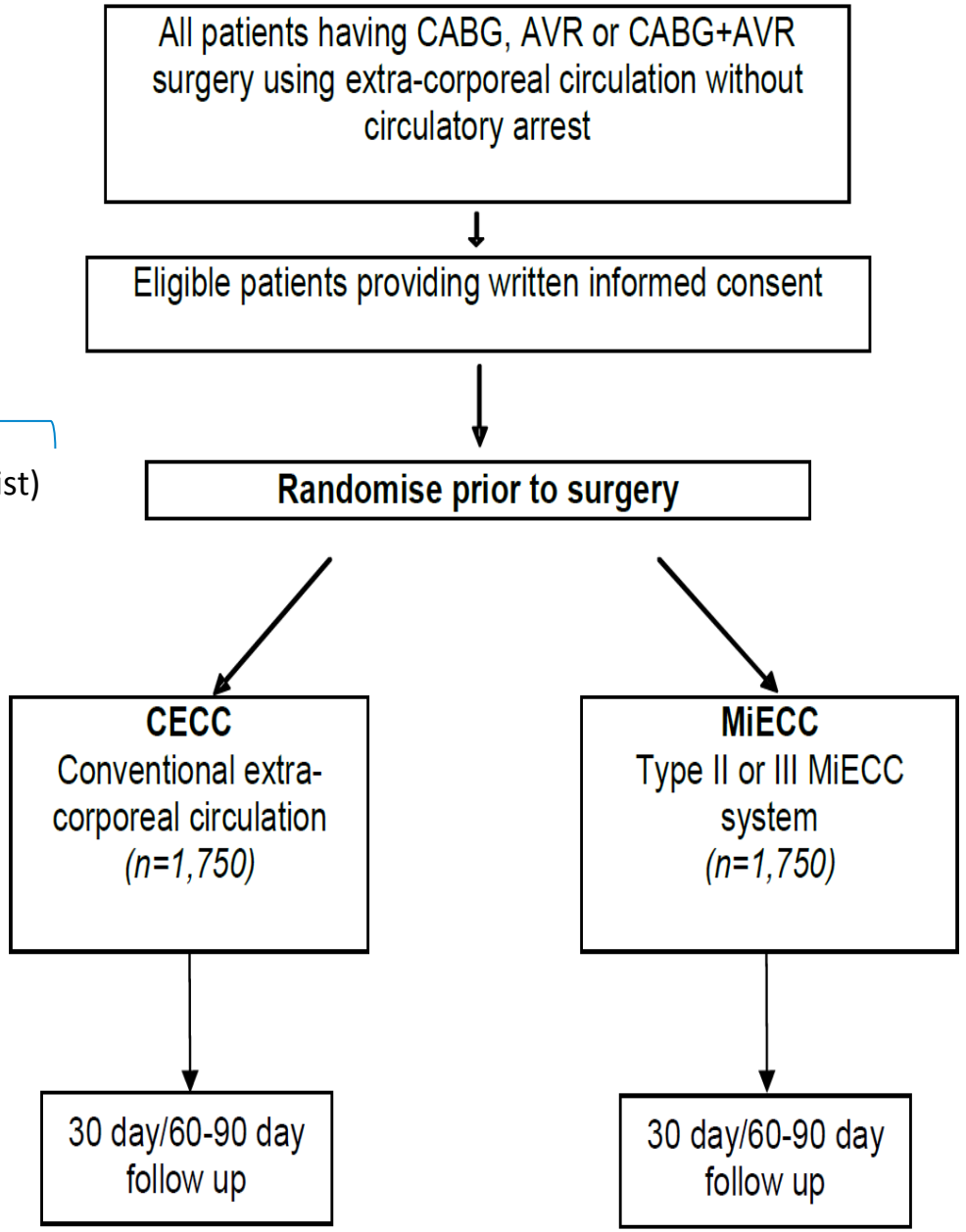
future

CoMICs trial

a centre (team: surgeon, perfusionist, anesthesiologist) must have used MiECC for > 50 operations

24 participating centres so far: still recruiting

estimated launch: November 2017



CoMICs trial

Primary outcome

composite of post-operative SAEs up to 30 days

- death
- myocardial infarction
- stroke
- gut infarction
- AKI
- reintubation
- tracheostomy
- mechanical ventilation for >48 hours
- reoperation
- sternal wound infection
- septicaemia

Secondary outcome

- all-cause mortality 30 days after randomization
- other SAEs 30 days after randomization
- units of RBC transfused up to 30 days
- other blood products transfused up to 30 days
- delirium
- time to discharge from cardiac ICU
- time to discharge from hospital
- health-related quality of life up to 90 days
- health and social care resources and costs up to 90 days

CoMICs trial

Participating Centres

Thessaloniki Greece	Bern Switzerland	Braunschweig Germany	Regensburg Germany
Coswig Germany	Bad Oeynhausen Germany	Cologne Germany	Berlin Germany
Ulm Germany	Maastricht The Netherlands	Ankara Turkey	Singapore Singapore
Plymouth UK	Hull UK	London UK	Bristol UK
Monza Italy	Bari (1) Italy	Bari (2) Italy	Torino Italy
London Canada	Toronto Canada	Dammam Saudi Arabia	Jerusalem Israel

Minimal invasive ExtraCorporeal Circulation

MiECC

events

MiECTiS

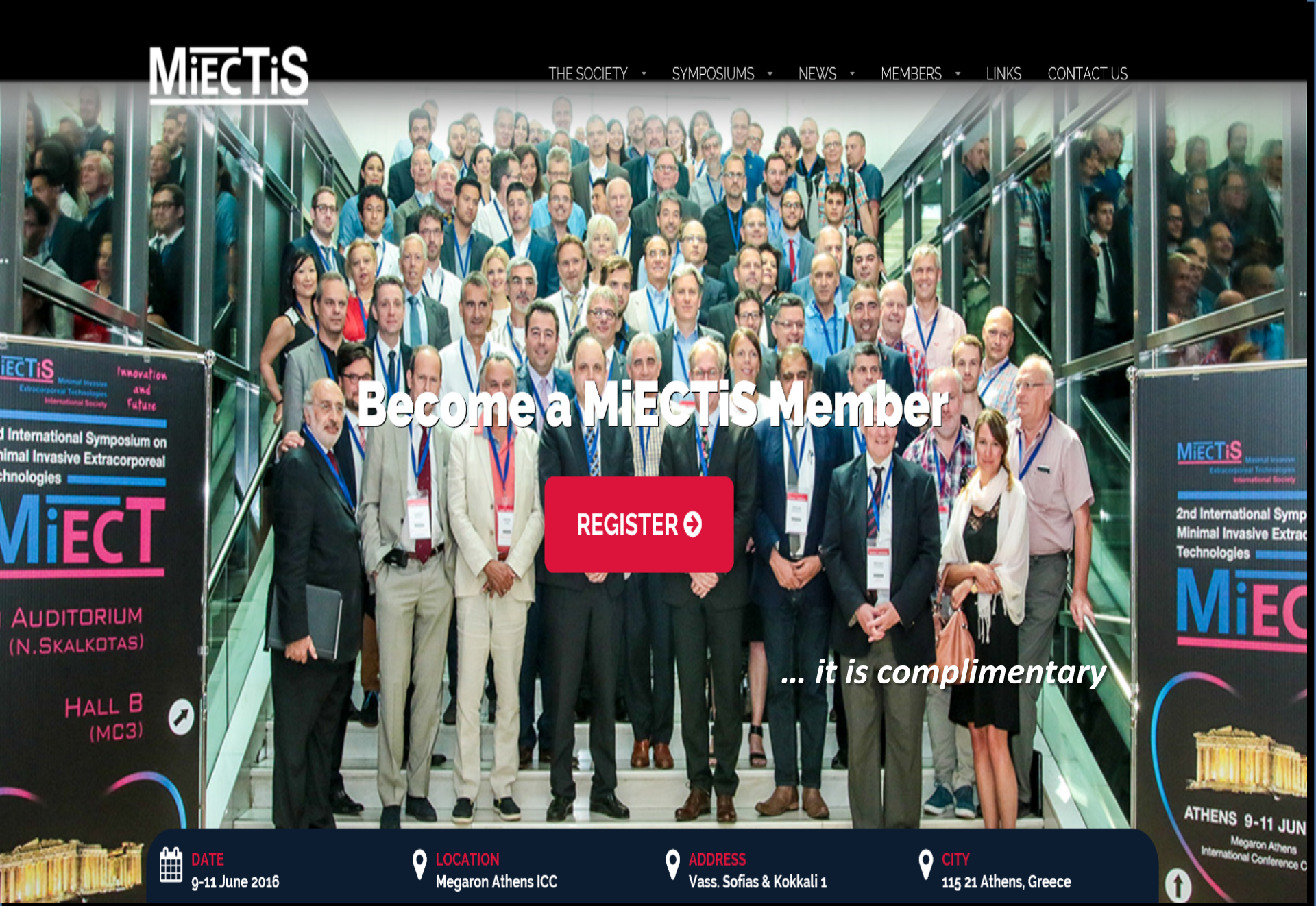

MiECT
Minimal Invasive
Extracorporeal Circulation Technologies
1st International Symposium
on Minimal Invasive Extracorporeal Circulation Technologies
June 13th-14th 2014
Thessaloniki, Greece


MiECTiS
Minimal Invasive Extracorporeal Technologies International Society
Innovation and Future
2nd International Symposium on Minimal Invasive Extracorporeal Technologies
MiECT
ATHENS 9-11 JUNE 2016
Megaron Athens
International Conference Center


3rd MiECT SYMPOSIUM
of the Minimal Invasive Extra Corporeal Technologies International Society
BERN
BERN | SWITZERLAND | 22 – 23 JUNE 2018
INNOVATION AND FUTURE
conference programme
Dear Colleagues and Friends,
It is my great pleasure to invite you to the 3rd MiECT SYMPOSIUM. During the last years, innovative progress has been made in minimal invasive extracorporeal technologies opening up new opportunities for the development of cardiac surgery treatment strategies.
We are happy to welcome you in Bern, to share and discuss scientific issues, and to foster personal relationships with colleagues from all over the world. Besides excellent scientific lectures, we are sure you will enjoy the Swiss hospitality and the great atmosphere of the capital of Switzerland with its old town, a UNESCO World Cultural Heritage Site.
Prof. Dr. med. Dr. h.c. Thierry Carrel
Congress President

Webinar

Live: www.miectis.org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