

A dramatic sunset sky with a city skyline silhouette at the bottom. The sun is low on the horizon, casting a golden glow through the clouds. The city skyline is visible in the distance, with several tall buildings. The overall mood is celebratory and nostalgic.

OR

31st Anniversary

OUTCOMES RESEARCH Consortium
2021 Annual Report
- 31st Anniversary -

The **OUTCOMES RESEARCH** Group was formed in 1990 at the University of California in San Francisco and subsequently became an institute when the group's administrative center moved to the University of Louisville in March of 2000. In 2005, **OUTCOMES RESEARCH** became a department at the Cleveland Clinic. After 15 years, the Department of **OUTCOMES RESEARCH** now includes 65 members at the Clinic, among more than 190 academic investigators in twenty countries including the Austria, Canada, China, Ireland, Israel, Japan, China, and the United States. The Consortium is non-profit; its only goal is thus participation in high-quality research.

The Consortium has published more than 1,600 full papers and more than 80 editorials. The collaboration publishes a full paper every 3 days.

The Consortium is currently involved in about 150 clinical studies, including many large multi-center outcome trials. Funding for the Consortium's funding is from various peer-reviewed granting agencies, and we also collaborate with companies that make innovative devices and drugs, often conducting major trials that lead to regulatory certification. The Consortium facilitates scientific exchange and collaboration necessary for technically complex outcomes studies involving hundreds or thousands of patients. Additional information is available at www.OR.org.

Aspirations

OUTCOMES RESEARCH seeks to understand the end results of particular health care practices and interventions. End results include effects that people experience and care about, such as change in the ability to function. In particular, for individuals with chronic conditions—where cure is not always possible—end results include quality of life as well as mortality. By linking the care people get to the outcomes they experience, **OUTCOMES RESEARCH** has become the key to developing better ways to monitor and improve the quality of care.

The general goal of the **OUTCOMES RESEARCH** Consortium is to evaluate inexpensive, low-risk interventions that are easy to implement yet likely to markedly improve outcome. For example, we have shown that simply maintaining intraoperative normothermia markedly reduces the risk of complications — and does so at trivial cost. A consequence of our work is that active intraoperative warming has become routine, whereas it was previously rare. Current focus areas include cardiovascular complica-

tions, postoperative delirium, and management of acute surgical pain.

Mission

Be the world's leading clinical anesthesia-related research organization.

Behaviors

- 1 Publish more high-impact, peer-reviewed clinical research papers (quantified as number times impact) than any other anesthesia organization.
- 2 Recruit more extra-mural clinical research funding than any other anesthesia organization, with “clinical research” being defined as research conducted with human subjects.
- 3 Train clinical investigators at all levels.

Personnel



Director
Daniel I. Sessler MD, Cleveland



Vice-director
Alparslan Turan MD, Cleveland

2021 Site Directors

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Thomas Volk	Homburg	Germany
Colin Royse	Melbourne	Australia
Brian Ilfeld	San Diego	USA
PJ Devereaux	Hamilton	Canada
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Ngai Liu	Paris	France
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Members

1 Alaa A. Abd-Elseyed, M.D.	Madison	USA
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17 Beatrice Beck-Schimmer, MD	Zurich	Switzerland
18 Sergio D. Bergese, M.D.	Stony Brook	USA
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20 Peter Biro, M.D.	Zurich	Switzerland
21 Joshua A. Bloomstone, M.D., M.Sc	Glendale	USA
22 Hagen Bomberg, M.D.	Zurich	Switzerland
23 Mauro Bravo, M.D.	Cleveland	USA
24 Jack Brooker, MD	Cleveland	USA
25 Donal J. Buggy, M.D., FRCPI, FRCACSI, FRCA	Dublin	Ireland
26 Juan Cata, M.D.	Houston	USA
27 Praveen Chahar, M.D., F.C.A.R.C.S.I.	Cleveland	USA
28 Athanasios F. Chalkias, MD, MSc, PhD, FESC, FA- cadTM, FCP	Larisa	Greece
29 Surendrasingh S. Chhabada, M.D.	Cleveland	USA
30 Anne Cipriani	Cleveland	USA
31 Barak Cohen, M.D.	Tel Aviv	Israel
32 Allen Collins	Cleveland	USA
33 Jacek B. Cywinski, M.D.	Cleveland	USA
34 Albert Dahan, MD	Leiden	Netherlands
35 Jarrod E. Dalton, Ph.D.	Cleveland	USA

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37	Jagan Devarajan, MD	Cleveland	USA
38	Philip J. Devereaux, M.D., Ph.D.	Hamilton	Canada
39	Aimee Drury	Cleveland	USA
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41	Emmanuelle Duceppe, MD., Ph.D.	Montreal	Canada
42	Andra E. Duncan, M.D.	Cleveland	USA
43	Ruthy Edry, M.D.	Haifa	Israel
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45	Elyad Ekrami, MD	Cleveland	USA
46	Hesham Elsharkawy, M.D.	Cleveland	USA
47	Okan Ermis, M.D.	Cleveland	USA
48	Hani Essber, M.D.	Cleveland	USA
49	Stephanie Ezeoke, BS	Cleveland	USA
50	Tibi Ezri, M.D.	Tel Aviv	Israel
51	Ehab S.A. Farag, M.D., F.R.C.A.	Cleveland	USA
52	Tobias Fink, M.D.	Homburg	Germany
53	John J. Finneran IV, M.D.	San Diego	USA
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55	Bela Fulesdi, M.D., Ph.D.	Debrecen	Hungary
56	Rodney A. Gabriel, M.D.	La Jolla	USA
57	Marcelo Gama de Abreu, M.D., M.Sc., Ph.D., D.E.S.A	Cleveland	USA
58	Martin V. Grady, M.D.	Mayfield Heights	USA
59	Yanyan Han, MS	Cleveland	USA
60	Manal Hassan, M.D.	Mayfield Heights	USA
61	Yuguang Huang, M.D.	Beijing	China
62	Tobias Hüppe, M.D., D.E.S.A., E.D.I.C.	Homburg (Saar)	Germany
63	Takehiko Ikeda, M.D.	Tokorozawa	Japan
64	Brian M. Ilfeld, M.D., M.S.	San Diego	USA
65	Ilker Ince, MD	Erzurum	Turkey
66	Steven R. Insler, D.O.	Cleveland	USA
67	Daniela C. Ionescu, Ph.D., D.E.A.A.	Cluj-Napoca	Romania
68	Tadahiko Ishiyama, M.D., Ph.D.	Chuo	Japan
69	Pia Jaeger, M.D., Ph.D.	Copenhagen	Denmark
70	Jens-Ulrik S. Jensen, M.D., Ph.D.	Copenhagen	Denmark
71	Qiliang Jiang, M.D., Ph.D.	Shanghai	China
72	Roberta Johnson	Cleveland	USA
73	Barbara Kabon, M.D.	Vienna	Austria
74	Tyler Karras, DO	Cleveland	USA

75	Roop Kaw, M.D.	Cleveland	USA
76	Ashish K. Khanna, M.D., F.C.C.P., F.C.C.M.	Wake Forest	USA
77	Sandeep Khanna, M.D.	Cleveland	USA
78	Daniel Kim, M.D.	Houston	USA
79	Oliver Kimberger, M.D.	Vienna	Austria
80	Ryu Komatsu, M.D.	Baltimore	USA
81	Orkun Kopac, MD	Cleveland	USA
82	Sascha Kreuer, M.D.	Homburg	Germany
83	Priya A. Kumar, M.D.	Chapel Hill	USA
84	Andrea M. Kurz, M.D.	Cleveland	USA
85	Esra Kutlu Yalcin, M.D.	Cleveland	USA
86	Giovanni Landoni, M.D.	Milan	Italy
87	Kai Li, M.D., Ph.D.	Cleveland	USA
88	Qian Li, M.D.	Chengdu	China
89	Jing Lin, M.D.	Chengdu	China
90	Liu Liu, M.A.	Cleveland	USA
91	Ngai Liu, M.D., Ph.D.	Suresnes	France
92	Vladimir V. Lomivorotov, M.D., Ph.D.	Novosibirsk	Russia
93	Dominik Lorenz, M.D.	Homburg / Saar	Germany
94	Anthony T. Machi, M.D.	Dallas	USA
95	Kamal Maheshwari, M.D., M.P.H.	Cleveland	USA
96	Guangmei Mao, M.S.	Cleveland	USA
97	Metty Markwei, B.S.	Baltimore	USA
98	Edward J. Mascha, Ph.D.	Cleveland	USA
99	Takashi Matsukawa, M.D.	Chuo	Japan
100	Felix Maurer, B.S.	Homburg	Germany
101	Mark Mettler	Cleveland	USA
102	Scott A. Miller, M.D.	Winston Salem	USA
103	Steven C. Minear, MD	Weston	USA
104	Toshiki Mizobe, M.D., Ph.D.	Kyoto	Japan
105	Mateo Montalvo, M.D.	Cleveland	USA
106	Eassen Mu, M.D.	Beijing	China
107	Carolin Müller, M.D.	Homburg	Germany
108	Lukas M. Müller-Wirtz, M.D.	Homburg	Germany
109	Yasuko Nagasaka, M.D., Ph.D.	Tokyo	Japan
110	Yasufumi Nakajima, M.D., Ph.D.	Hirakata	Japan
111	Rod Nault, M.S.	Cleveland	USA
112	Tyng Yan Ng, M.B.B.S.	Kuala Lumpur	Malaysia
113	Ben O'Brien, M.D., Ph.D., M.H.B.A., F.R.C.A., F.F.I.C.M.	Berlin	Germany

114	Beth O'Brien, B.S.	Cleveland	USA
115	Detlef E.R. Obal, M.D., Ph.D., D.E.S.A.	Palo Alto	USA
116	Ibrahim Onal, M.D.	Konya	Turkey
117	Makoto Ozaki, M.D., Ph.D.	Tokyo	Japan
118	Matt A. Pappas, M.D., M.P.H.	Cleveland	USA
119	Marie-Odile Parat, Pharm.D., Ph.D.	Woolloongabba	Australia
120	Lijian Pei, M.D.	Beijing	China
121	Silvia E. Perez-Protto, M.D., M.S.	Cleveland	USA
122	Olga M. Plattner, M.D.	Vienna	Austria
123	Attila Podolyak, M.D.	Cleveland	USA
124	Xuan Pu, M.S.	Cleveland	USA
125	Yuwei Qiu, M.D.	Shanghai	China
126	Shobana Rajan, M.D.	Cleveland	USA
127	Christian Reiterer, MD	Vienna	Austria
128	David A. Rincon-Valenzuela, M.D., M.Sc.	Bogotv°	Colombia
129	Eva Rivas Ferreira, M.D.	Barcelona	Spain
130	Efrain Riveros-Perez, M.D.	Augusta	USA
131	Fabio A. Rodriguez-Patarroyo, M.D.	Cleveland	USA
132	Reitze N. Rodseth, M.B.Ch.B., F.C.A., M.Med.	Durban	South Africa
133	Julian V. Rossler, M.D.	Zurich	Switzerland
134	Colin Royse, M.D.	Melbourne	Australia
135	Kurt Ruetzler, M.D.	Cleveland	USA
136	Remie Saab, M.D.	Cleveland	USA
137	Leif Saager, M.D.	Goettinghen	Germany
138	Wael Saasouh, M.D.	Detroit	USA
139	Ogena Saied	Cleveland	USA
140	Vafi Salmasi, M.D.	Palo Alto	USA
141	Ethan L. Sanford, M.D.	Dallas	USA
142	Bernd Saugel, M.D. E.D.I.C.	Hamburg	Germany
143	Rita Saynhalath, M.D.	Dallas	USA
144	Yehoshua-Nadav Schacham, M.D.	Ramat-Gan	Israel
145	Eitan Scher Nemirovsky, MD	Cleveland	USA
146	Martin Schlapfer, M.D., M.Sc.	Zurich	Switzerland
147	Marc Schmidt, M.D.	Zurich	Switzerland
148	Gokhan Sertcakacilar, MD	Cleveland	USA
149	Daniel I. Sessler, M.D.	Cleveland	USA
150	Karan Shaw, M.S.	Cleveland	USA
151	Tetsuya Shimada, M.D.	Tokorozawa	Japan
152	Alexis Skolaris	Cleveland	USA

153	Jeff W. Steiner, D.O.	Dallas	USA
154	Matthew W. Swisher, M.D., M.S.	La Jolla	USA
155	Wojciech Szczeklik, M.D., Ph.D.	Krakow	Poland
156	Peter Szmuk, M.D.	Dallas	USA
157	Abdullah S. Terkawi, M.D.	Charlottesville	USA
158	Yasin Tire, MD	Cleveland	USA
159	Uchida Tokujiro, M.D., Ph.D.	Tokyo	Japan
160	David Torres, M.D.	Santiago	Chile
161	Alparslan Turan, M.D.	Cleveland	USA
162	Tamas Vegh, M.D., Ph.D.	Debrecen	Hungary
163	Andrew Volio, D.O.	Cleveland	USA
164	Thomas Volk, M.D.	Homburg	Germany
165	Anupama Wadhwa, M.D.	San Diego	USA
166	Michael Walters	Cleveland	USA
167	Catherine I. Wang, M.D.	Beijing	China
168	Dong Wang, M.S.	Cleveland	USA
169	Dong-Xin Wang, M.D., Ph.D.	Beijing	China
170	Jiayi Wang, MD	Shanghai	China
171	Peiyan Wang, MS	Cleveland	USS
172	Marita Windpassinger, MD	Vienna	Austria
173	Kiran Winemiller, BS	Cleveland	USA
174	Jason Wu, M.D.	Shanghai	China
175	Lexie Xu, M.D.	Beijing	China
176	Ece Yamak Altinpulluk, M.D.	Istanbul	Turkey
177	Dongsheng Yang, M.S.	Cleveland	USA
178	Jean-Pierre Yared, M.D.	Cleveland	USA
179	Peter Yassa, MD	Cleveland	USS
180	Oguz Yilmaz, M.D.	Izmir	Turkey
181	Hai Yu, M.D.	Chengdu	China
182	Kan Zhang, M.D.	Cleveland	USA
183	Xiaobao Zhang, M.D.	Lianyungang	China

Research Fellows



Chief Fellow
Esra Kutlu Yalcin, M.D. 2021-

Name	Origin	Dates	Subsequent Position
2 Mauro Bravo, M.D.	Venezuela	2018-21	Anesthesia residency, Cleveland Clinic
3 Hani Essber, M.D.	Syria	2019-	
4 Ece Yamak Altinpulluk, M.D.	Turkey	2019-21	Faculty, Cerrahpasa Medical School
5 Andrew Volio, D.O.	United States	2019-21	Internal medicine residency, Ohio State
6 Ahmed Algharrash, M.D.	Saudi Arabia	2019-21	Fellowship, McGill University
Omer Bakal, M.D.	Turkey	2019-	
7 Kai Li, M.D.	China	2019-21	Anesthesia Faculty, Japan-China Union Hosp
8 Esra Kutlu Yalcin, M.D.	Turkey	2019-	
9 Fabio Rodriguez Patarryo, M.D.	Colombia	2019-	
10 Ahmed Al Gharrash, M.D.	Saudi Arabia	2020-21	Cardiac anesthesia fellowship, McGill Univ
11 Jorge Araujo Duran, M.D.	Colombia	2020-	
12 Mateo Montalvo, M.D.	Ecuador	2020-	
13 Sinem Sari Ozturk, M.D.	Turkey	2020-21	
14 Momina Sharif Umair, M.D.	Pakistan	2020-21	
15 Jeevan Shivakumar, M.D.	India	2020-21	
16 Marc Schmidt, M.D.	Switzerland	2020-21	Anesthesia faculty, University of Zurich
17 Tyler Karras, M.D.	USA	2021-22	Anesthesia residency, Alleghany Health

18 Eitan Scher, M.D.	Venezuela	2021-
19 Jack Booker, M.D.	Scotland	2021-
20 Federico A. Cardenas, M.D.	Colombia	2021-
21 Elyad Ekrami, M.D.	Iran	2020-
22 Orkun Kopac, M.D.	Turkey	2021-
23 Gokhan Sertcacilar, M.D.	Turkey	2021-
24 Yasin Tire, M.D.	Turkey	2021-

Graduate and Medical Students (full year)

Name	Origin	Dates	Subsequent Position
1 Alexis Skolaris, B.S.	USA	2019-21	
2 David Lynn, B.S.	USA	2020-20	Coordinator, Taussig Cancer Center
3 David Hoying, B.S.	USA	2020-21	
4 Oguzalp Turan, M.S.	USA	2020-21	Northeast Ohio Medical School
5 Stephanie Ezeoke, B.S.	USA	2021-	
6 Kiran Winemiller, B.S.	USA	2021-22	Case Western Dental School
7 Anne Cipraini, B.S.	USA	2021-22	Case Western Medical School
8 Nicole Brown, B.S.	USA	2021-	
9 Metabel Markwei, B.S.	USA	2020-21	Cleveland Clinic Lerner College of Medicine
10 Rod Nault, B.S.	USA	2020-21	Case Western Research School of Medicine

Honors and Awards

Name	Honor	Organization
Hesham Elsharkawy	Associate Editor	Reg Anesth Pain Management
Ashish Khanna	Vice-chair for research	Wake Forest, Department of Anesthesia
Sanchit Ahuja	Resident scholar	FAER
Juan Cata	Vice-chair for Clinical Research	Dept of Anesthesiology, MD Anderson
Jack Brooker	2nd Place, resident research	Ohio Society of Anesthesia
Brian Ilfeld	Labat Award	American Society of Regional Anesthesia
Priya A. Kumar	Outstanding Service Award	UNC Anesthesiology
Athanasios Chalkias	Associate Editor	Frontiers in Medicine, Intensive Care & Anesthesiology

Consortium Research Awards

The **Gladys Sessler Prize** is an endowed award that is given yearly. All members of the **OUTCOMES RESEARCH Consortium** are eligible. This year's award was to **Prof. Kamal Maheshwari**.



The **Best Fellow Award** is given to the Department of **OUTCOMES RESEARCH** fellow who is voted by the faculty to have performed at the very highest level. This year's award was given to **Mauro Bravo** who was Chief Fellow before starting anesthesia residency at the Cleveland Clinic.

Publications

Contribution to the World's Literature

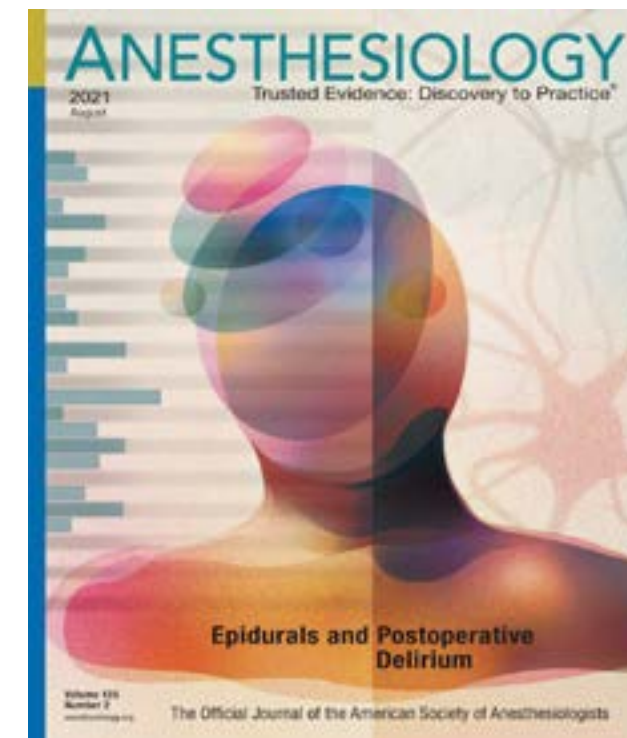
An article by Pagel and Hudetz (BMC Anesthesiology 12:5, 2012) evaluated anesthesia publication trends. In 2010, the last year they report, there were 665 clinical research articles published in the most influential anesthesia journals: **Anesthesiology, the British Journal of Anaesthesia, Anesthesia & Analgesia, Anaesthesia and the European Journal of Anaesthesia**. The Consortium publishes about 40 papers per year in the 14 journals they considered. The **OUTCOME RESEARCH Consortium** thus publishes more than at least 4% of the clinical research in high-profile general anesthesia journals. Of note, the Consortium also publishes nearly as many papers in specialty journals ranging from pain to critical care to neuroscience, and in major multi-specialty journals. Overall, the Consortium publishes a full paper every **2.5** days.

Since inception, the Consortium has published **1,600** full papers and more than **80** editorials.

Links to PDF versions of most full papers.

<https://www.dropbox.com/sh/rbp3a7p81oio4ly/AAAFanZEIQOpJbXStHkcRnPy?dl=0> (alphabetical) or <http://www.or.org/bibliography/> (chronological).

Featured on journal covers this year



This Year's Featured Paper

Du YT, Li YW, Zhao BJ, Guo XY, Feng Y, Zuo MZ, Fu C, Zhou WJ, Li HJ, Liu YF, Cheng T, Mu DL, Zeng Y, Liu PF, Li Y, An HY, Zhu SN, Li XY, Li HJ, Wu YF, Wang DX, Sessler DI, Peking University Clinical Research Program Study Group: Long-term survival after combined epidural-general anesthesia or general anesthesia alone: Follow-up of a randomized trial. *Anesthesiology* 2021; 135: 233-45.

BACKGROUND

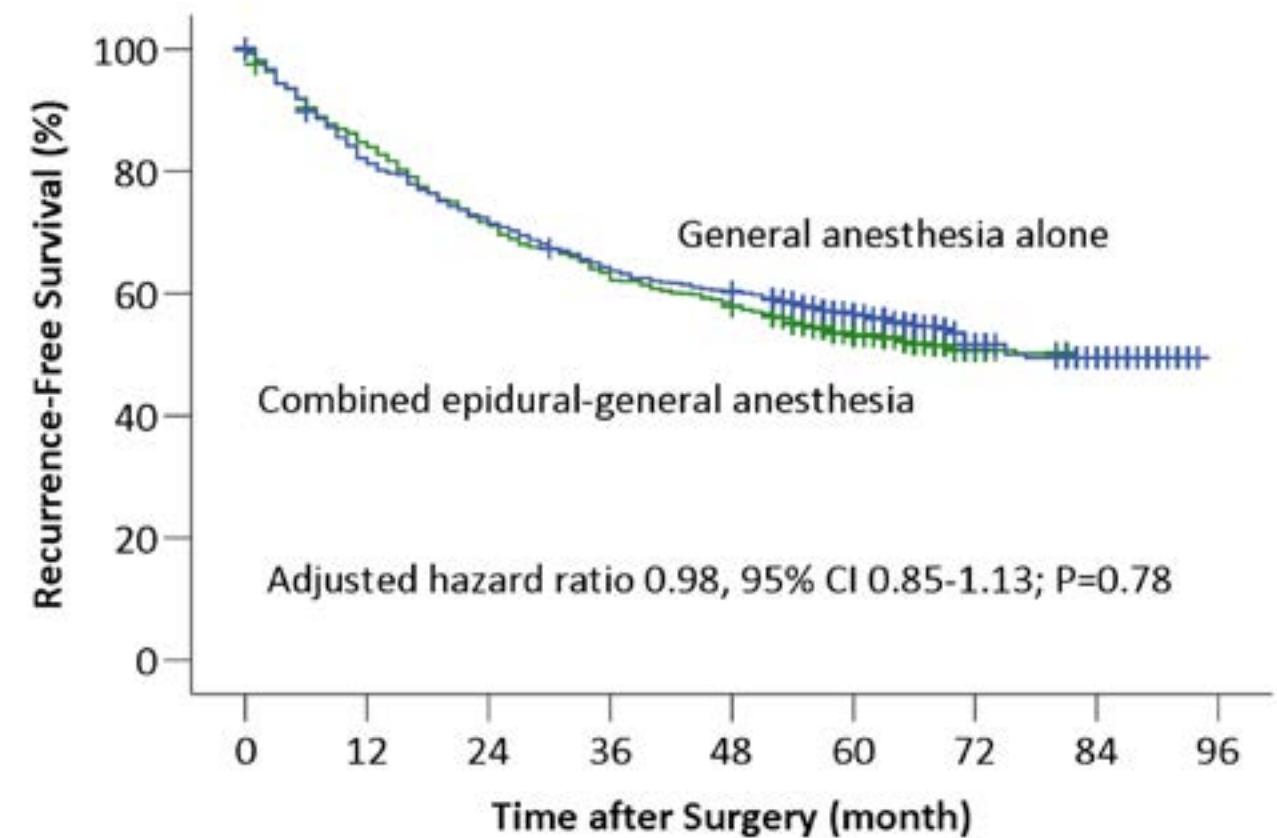
Experimental and observational research suggests that combined epidural-general anesthesia may improve long-term survival after cancer surgery by reducing anesthetic and opioid consumption and by blunting surgery-related inflammation. This study therefore tested the primary hypothesis that combined epidural-general anesthesia improves long-term survival in elderly patients.

METHODS

This article presents a long-term follow-up of patients enrolled in a previous trial conducted at five hospitals. Patients aged 60 to 90 yr and scheduled for major noncardiac thoracic and abdominal surgeries were randomly assigned to either combined epidural-general anesthesia with postoperative epidural analgesia or general anesthesia alone with postoperative intravenous analgesia. The primary outcome was overall postoperative survival. Secondary outcomes included cancer-specific, recurrence-free, and event-free survival.

RESULTS

Among 1,802 patients who were enrolled and randomized in the underlying trial, 1,712 were included in the long-term analysis; 92% had surgery for cancer. The median follow-up duration was 66 months (interquartile range, 61 to 80). Among patients assigned to combined epidural-general anesthesia, 355 of 853 (42%) died compared with 326 of 859 (38%) deaths in patients assigned to general anesthesia alone: adjusted hazard ratio, 1.07; 95% CI, 0.92 to 1.24; $P = 0.408$. Cancer-specific survival was similar with combined epidural-general anesthesia (327 of 853 [38%]) and general anesthesia alone (292 of 859 [34%]): adjusted hazard ratio, 1.09; 95% CI, 0.93 to 1.28; $P = 0.290$. Recurrence-free survival was 401 of 853 [47%] for patients who had combined epidural-general anesthesia versus 389 of 859 [45%] with general anesthesia alone: adjusted hazard ratio, 0.97; 95% CI, 0.84 to 1.12; $P = 0.692$. Event-free survival was 466 of 853 [55%] in patients who had combined epidural-general anesthesia versus 450 of 859 [52%] for general anesthesia alone: adjusted hazard ratio, 0.99; 95% CI, 0.86 to 1.12; $P = 0.815$.



CONCLUSIONS

In elderly patients having major thoracic and abdominal surgery, combined epidural-general anesthesia with epidural analgesia did not improve overall or cancer-specific long-term mortality. Nor did epidural analgesia improve recurrence-free survival. Either approach can therefore reasonably be selected based on patient and clinician preference.

Published Full Papers

- 1 Abdelmalak BB, Doyle DJ: Updates and controversies in anesthesia for advanced interventional pulmonology procedures. *Curr Opin Anaesthesiol* 2021; 34: 455-63
- 2 Aghamelu O, Buggy P, Smith G, Inzitari R, Wall T, Buggy DJ: Serum NETosis expression and recurrence risk after regional or volatile anaesthesia during breast cancer surgery: A pilot, prospective, randomised single-blind clinical trial. *Acta Anaesthesiol Scand* 2021; 65: 313-9

- 3 Arora H, Kumar PA: Case Series of Vacuum-Assisted Thrombectomy: An Acceptable Trade-Off in Evidence-Based Methodology? *J Cardiothorac Vasc Anesth* 2021; 35: 1046-8
- 4 Bhatia M, Kumar PA: Pro: Venoarterial ECMO Should Be Considered in Patients With COVID-19. *J Cardiothorac Vasc Anesth* 2021; 35: 703-6
- 5 Bhatia M, Kumar PA: Con: Routine Use of Fresh Frozen Plasma Should Not Be Used to Prime Cardiopulmonary Bypass Circuits During Cardiac Surgery. *J Cardiothorac Vasc Anesth* 2021; 35: 3122-4
- 6 Bravo M, Bakal O, Rivas E, Mascha EJ, Pu X, Mosteller L, Rodriguez-Patarroyo F, Essber H, AlGharrash A, Turan A: Effect of intravenous acetaminophen on mean arterial blood pressure: A post hoc analysis of the effect of intravenous acetaminophen on postoperative hypoxemia after abdominal surgery trial. *Anesth Analg* 2021; 133: 1532-9
- 7 Buggy DJ, Nolan R, Coburn M, Columb M, Hermanides J, Hollman MW, Zarbock A: Protocol for a prospective, international cohort study on the Management and Outcomes of Perioperative Care among European Diabetic Patients (MOPED). *BMJ Open* 2021; 11: e044394
- 8 Chalkias A, Mongardon N, Boboshko V, Cerny V, Constant AL, De Roux Q, Finco G, Fumagalli F, Gkamprela E, Legriel S, Lomivorotov V, Magliocca A, Makaronis P, Mamais I, Mani I, Mavridis T, Mura P, Ristagno G, Sardo S, Papagiannakis N, Xanthos T, Consortium P: Clinical practice recommendations on the management of perioperative cardiac arrest: A report from the PERIOPCA Consortium. *Crit Care* 2021; 25: 265
- 9 Chalkias A, Pantazopoulos I, Papagiannakis N, Skoulakis A, Laou E, Kolonia K, Ntalarizou N, Turlakopoulos K, Pagonis A, Kampolis C, De Guadiana Romualdo LG, Ragias D, Eugen-Olsen J, Gourgoulialis K, Arnaoutoglou E, Investigators S: Sinus bradycardia is associated with poor outcome in critically ill patients with COVID-19 due to the B.1.1.7 Lineage. *Toxicol Rep* 2021; 8: 1394-8
- 10 Chen X, Owen CA, Huang EC, Maggard BD, Latif RK, Clifford SP, Li J, Huang J: Artificial intelligence in echocardiography for anesthesiologists. *J Cardiothorac Vasc Anesth* 2021; 35: 251-61

- 11 Chin KJ, Versyck B, Elsharkawy H, Rojas Gomez MF, Sala-Blanch X, Reina MA: Anatomical basis of fascial plane blocks. *Reg Anesth Pain Med* 2021; 46: 581-99
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