

Cytoreductive surgery/HIPEC:

Is centralised, specialised care worth the trouble?

Prof. Dr. med. Ulrich Güller, MHS, FEBS

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Centralization CRS/HIPEC:

Pros and Cons?

Centralization CRS/HIPEC

PRO:

- high-volume centers/surgeons
- Higher volume => better outcomes?

Centralization CRS/HIPEC

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- high-volume centers/surgeons
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CON:

- travel/increased distances to next specialized center

Centralization CRS/HIPEC

PRO:

- high-volume centers/surgeons
- Higher volume => better outcomes?

CON:

- travel/increased distances to next specialized center
- **Against surgeon`s mentality**

Typical Surgeon:
„Anything is possible!“

Typical Surgeon:

„Anything is possible!“

„We are often wrong - but never in doubt!“

Special Article

HOSPITAL VOLUME AND SURGICAL MORTALITY IN THE UNITED STATES

JOHN D. BIRKMEYER, M.D., ANDREA E. SIEWERS, M.P.H., EMILY V.A. FINLAYSON, M.D., THERESE A. STUKEL, PH.D.,
F. LEE LUCAS, PH.D., IDA BATISTA, B.A., H. GILBERT WELCH, M.D., M.P.H., AND DAVID E. WENNBERG, M.D., M.P.H.

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- US Nationwide Inpatient Sample
- Medicare database
- 2,5 Millionen patients
- 1994 - 1999

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Is there a significant correlation between hospital
volume und postoperative mortality for high-risk
surgical procedures?

Special Article

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Hospital volume categorized in 5 groups:

- 1) Very small
- 2) Small
- 3) Medium
- 4) Large
- 5) Very large

Pancreatic Cancer Resection

Hospital Volume (Operations/year)	Very small (1)	Small (2-4)	Medium (5-7)	Large (8-19)	Very Large (>19)
Postoperative Mortality					

Pancreatic Cancer Resection

Hospital Volume (Operations/year)	Very small (1)	Small (2-4)	Medium (5-7)	Large (8-19)	Very Large (>19)
Postoperative Mortality	16.3%	14.6%	11.0%	7.2%	3.8%

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Difference postop. mortality: 12.5%

Pancreatic Cancer Resection

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Postoperative Mortality	16.3%	14.6%	11.0%	7.2%	3.8%
	1/6 dies				1/25 dies

Difference postop. mortality: 12.5%

Esophageal Cancer Resection

Hospital Volume (Operations/year)	Very small (1)	Small (2-4)	Medium (5-7)	Large (8-19)	Very large (>19)
Postoperative mortality					

Esophageal Cancer Resection

Hospital Volume (Operations/year)	Very small (1)	Small (2-4)	Medium (5-7)	Large (8-19)	Very large (>19)
Postoperative mortality	20.3%	17.8%	16.2%	11.4%	8.4%

Esophageal Cancer Resection

Hospital Volume (Operations/year)	Very small (1)	Small (2-4)	Medium (5-7)	Large (8-19)	Very large (>19)
Postoperative mortality	20.3%	17.8%	16.2%	11.4%	8.4%

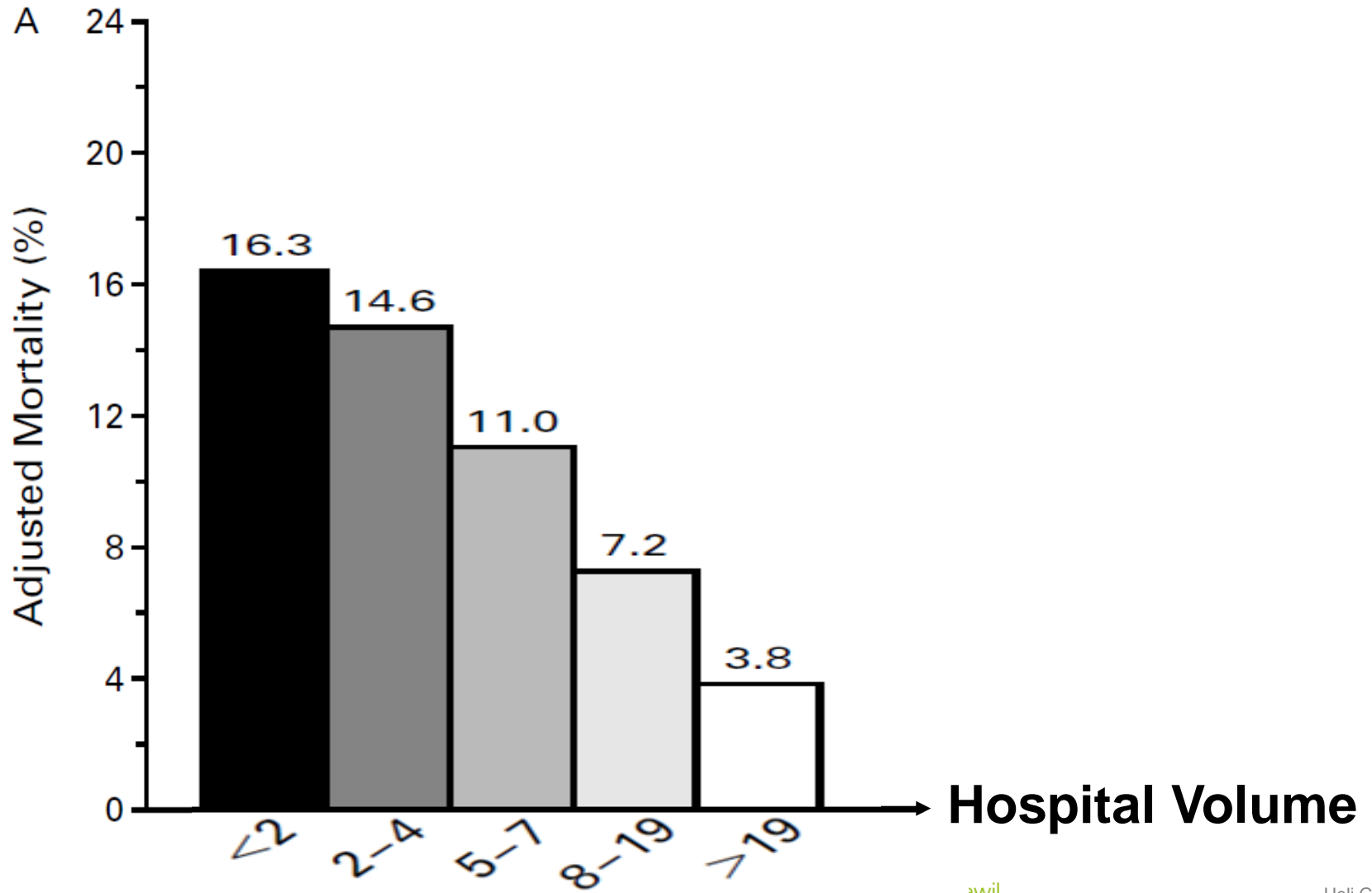
Difference postop. mortality: 11.9%

Esophageal Cancer Resection

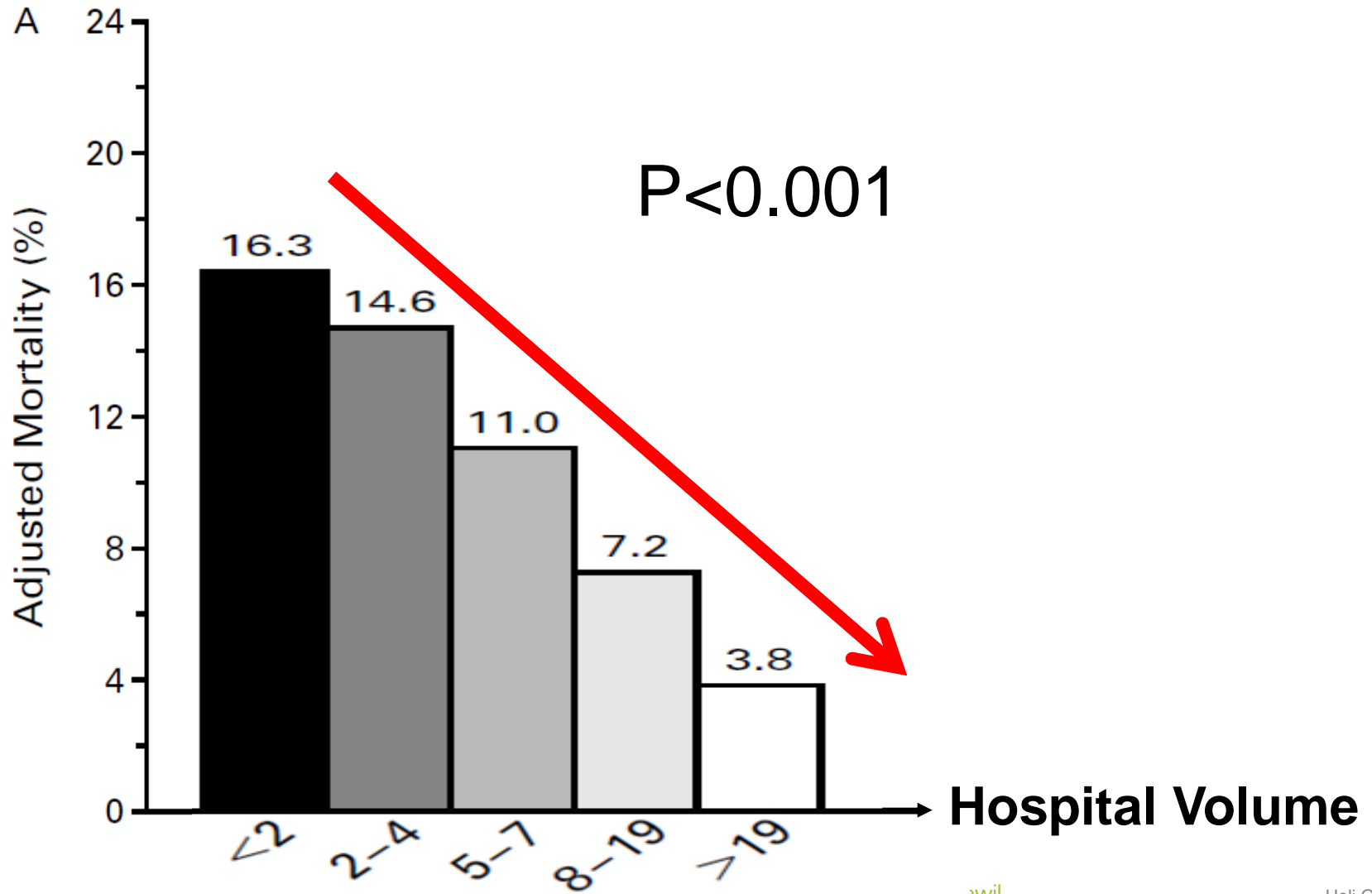
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	1/5 dies				1/12 dies

Difference postop. mortality: 11.9%

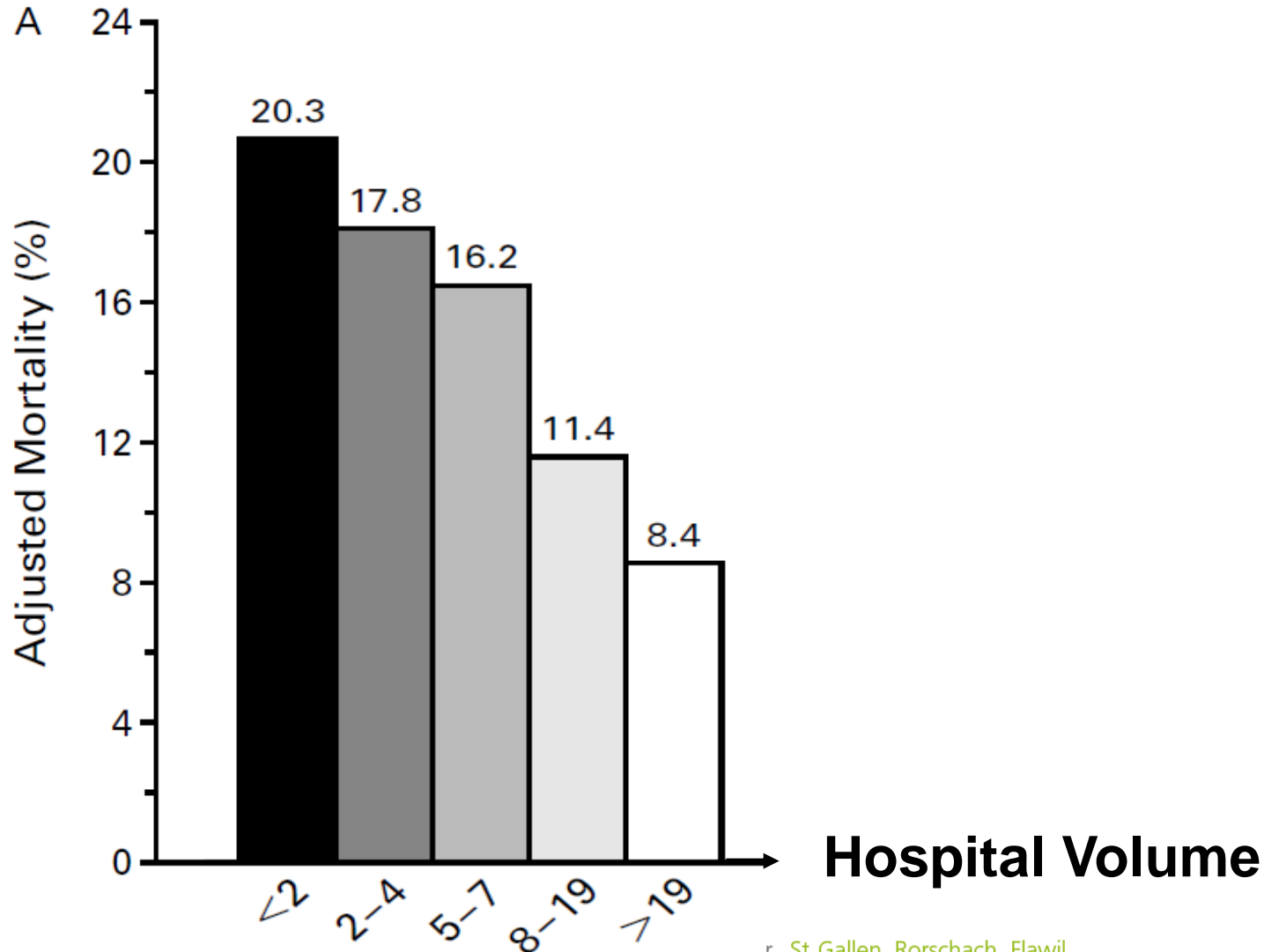
Pancreatic Cancer Resection



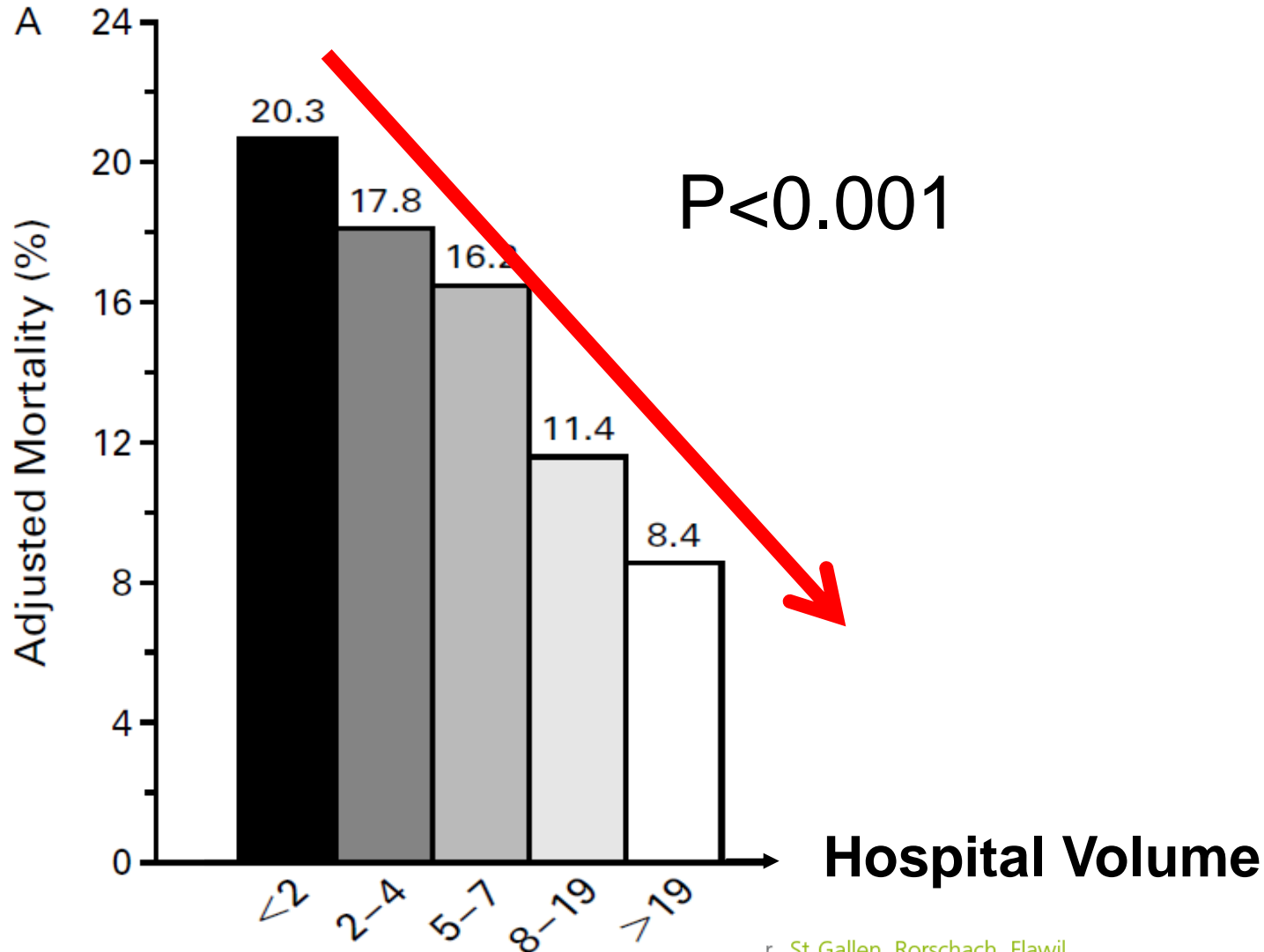
Pancreatic Cancer Resection



Esophageal Cancer Resection



Esophageal Cancer Resection



USA/Canada

Centralization of high-risk cancer operations in USA/Canada

Switzerland

- Debate about highly specialized medicine (HSM) in Switzerland
- CRS/HIPEC: not part of HSM program
- Should we centralize CRS/HIPEC?

Centralization of CRS/HIPEC

- Complex surgical procedures?
- Postoperative morbidity and mortality?

A Systematic Review on the Efficacy of Cytoreductive Surgery and Perioperative Intraperitoneal Chemotherapy for Pseudomyxoma Peritonei

Tristan D. Yan, BSc (Med) MBBS,¹ Deborah Black, BSc DipEd MStat PhD,²
Renaldo Savady, MD,¹ and Paul H. Sugarbaker, MD¹

¹Peritoneal Surface Malignancy Program, Washington Cancer Institute, Washington Hospital Center, 106 Irving Street, NW, Suite 3900N, Washington, DC 20010, USA

²School of Public Health and Community Medicine, The University of New South Wales, Sydney, Australia

- Literature search
- PMP undergoing CRS/HIPEC

Morbidity/Mortality

TABLE 4. *Morbidity and mortality of cytoreductive surgery combined with perioperative intraperitoneal chemotherapy for pseudomyxoma peritonei*

Investigator	n	Morbidity (%)	Hematological toxicity (%)	Blood loss (cm ³)	Operation duration hours	Reoperation (%)	Mortality (%)	Hospital stay (days)
Sugarbaker ³¹	356	40	5	–	–	11	2	21
Zoetmulder ³⁵	103	54	–	8000	9	–	3	21
Loggie ⁴⁰	110	38	4	–	10.5 ^a	–	–	–
Piso ⁴²	28	36	–	2100	6.0 ^a	21	7	29 ^a
Deraco ⁴⁴	33	33	9	–	12.6 ^a	–	3	–
Glehen ⁴⁶	27	44	–	–	–	–	0	16
McGregor ⁴⁷	11	56	–	–	–	–	18	–
Morris ⁴⁸	50	48	–	–	10.0 ^a	–	4	26 ^a

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- Morbidity ranges from 33% - 56%
- Mortality ranges from 0% - 18%

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⇒ Vast range of morbidity and mortality!

⇒ Complex, high-risk surgery!

ORIGINAL ARTICLE

ONLINE FIRST

Initial Experience With Hyperthermic Intraoperative Chemotherapy

Olivier Turrini, MD; Eric Lambaudie, MD; Marion Faucher, MD; Frédéric Viret, MD; Jean Louis Blache, MD; Gilles Houvenaeghel, MD; Jean Robert Delpero, MD

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ONLINE FIRST

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Olivier Turrini, MD; Eric Lambaudie, MD; Marion Faucher, MD; Frédéric Viret, MD; Jean Louis Blache, MD; Gilles Houvenaeghel, MD; Jean Robert Delpero, MD

- 60 consecutive patients CRS/HIPEC
- Primary: Colorectal, PMP, ovary, appendix
- Prospective database
- 2004 - 2010
- Outcomes analyzed for first (patients 1-20), second (patients 21-40) and third period (patients 41 – 60)

Table 3. Perioperative Outcomes of Patients Who Underwent Cytoreduction Surgery Plus HIPEC According to Period of Achievement^a

Outcome	Period (No. of HIPEC Procedures)		
	1 (0-20)	2 (21-40)	3 (41-60)
PCI, mean (SD)	9.5 (5.6)	9.5 (3.6)	9.8 (3.4)
Operative duration, mean (SD), min	409.5 (157.4)	398.5 (135.2)	424 (149.2)
Intraoperative blood loss, mean (SD), mL/L	544 (244)	402.5 (273.6)	403.5 (264)
Patients receiving red cell transfusion	11 (55)	4 (20)	2 (10)
Red cell transfused, mean (SD), U	7.2 (11)	1.7 (4.1)	0.5 (1.8)
Morbidity	8 (40)	6 (30)	5 (25)
Digestive fistula	3 (15)	2 (10)	1 (5)
Hematologic toxicity	4 (20)	2 (10)	2 (10)
Gastric emptying	2 (10)	2 (10)	2 (10)
Others	1 (5)	2 (10)	1 (5)
Grade I/II ^b	1 (5)	4 (20)	4 (20)
Grade III/IV ^b	7 (35)	2 (10)	1 (5)
Reintervention	7 (35)	3 (15)	1 (5)
Length of hospital stay, mean (SD), d	27 (16)	21 (10)	20 (10)
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Conclusion

- Significant reduction of perioperative transfusions, morbidity and reintervention rate after 40 procedures.
- Clear and steep learning curve

Pseudomyxoma peritonei: A French multicentric study of 301 patients treated with cytoreductive surgery and intraperitoneal chemotherapy

D. Elias ^{a,*}, F. Gilly ^b, F. Quenet ^c, J.M. Bereder ^d, L. Sidéris ^e, B. Mansvelt ^f,
G. Lorimier ^g, O. Glehen ^b,
the Association Française de Chirurgie

- 18 French-speaking centers
- 301 patients mit PMP
- 1993 - 2007
- Cytoreductive surgery/HIPEC or EPIC

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- 301 patients: 18 centers = 17 patients/center

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- 301: 18 centers = 17 patients/center
- 17 patients/center : 15 years = 1.13 patient/center/year!!!

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- No of patients treated per center: range 1 - 130

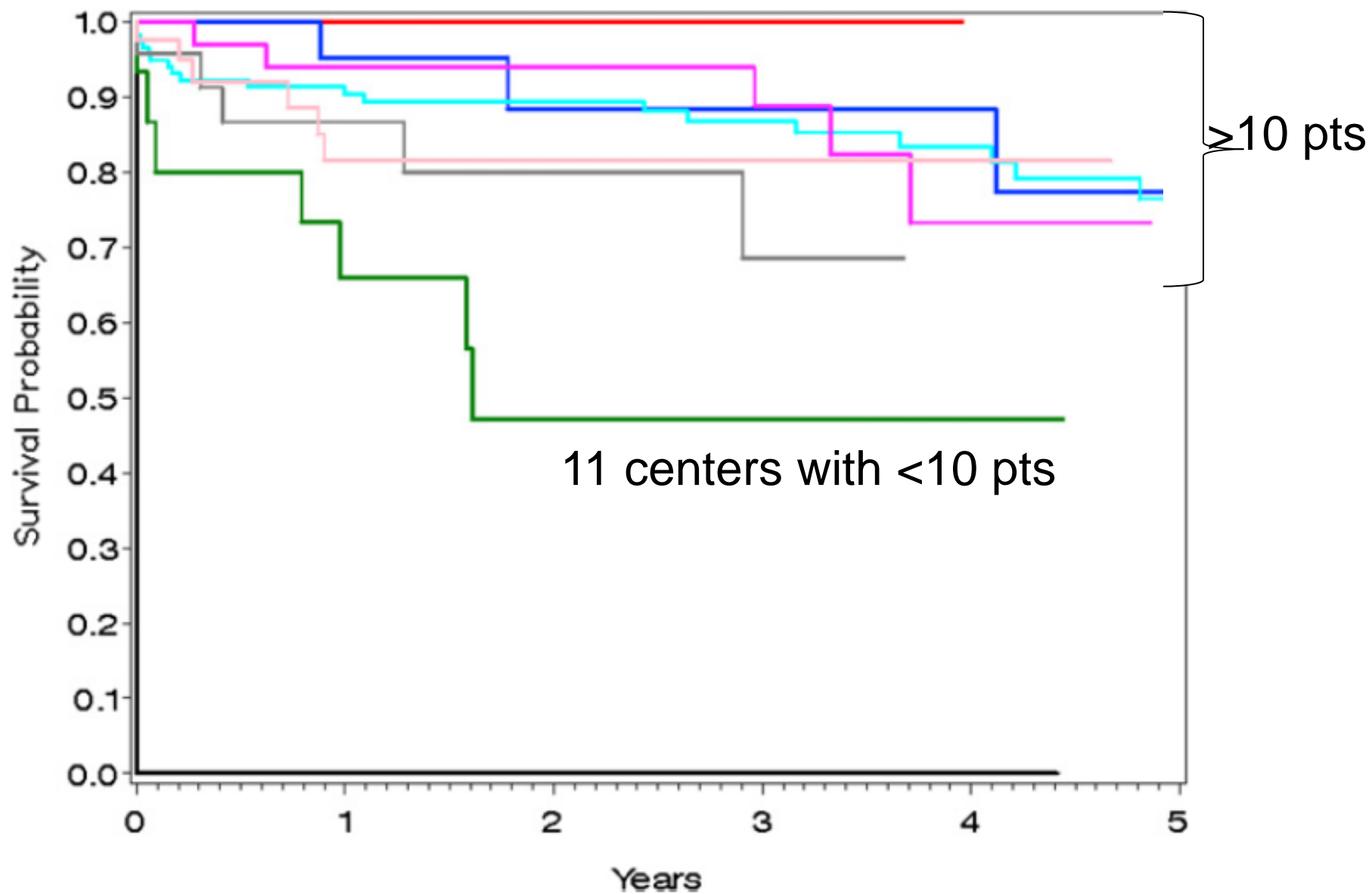


Figure 2. Overall survival according to the centers ($p < 0.001$) (the names of centers are censored).

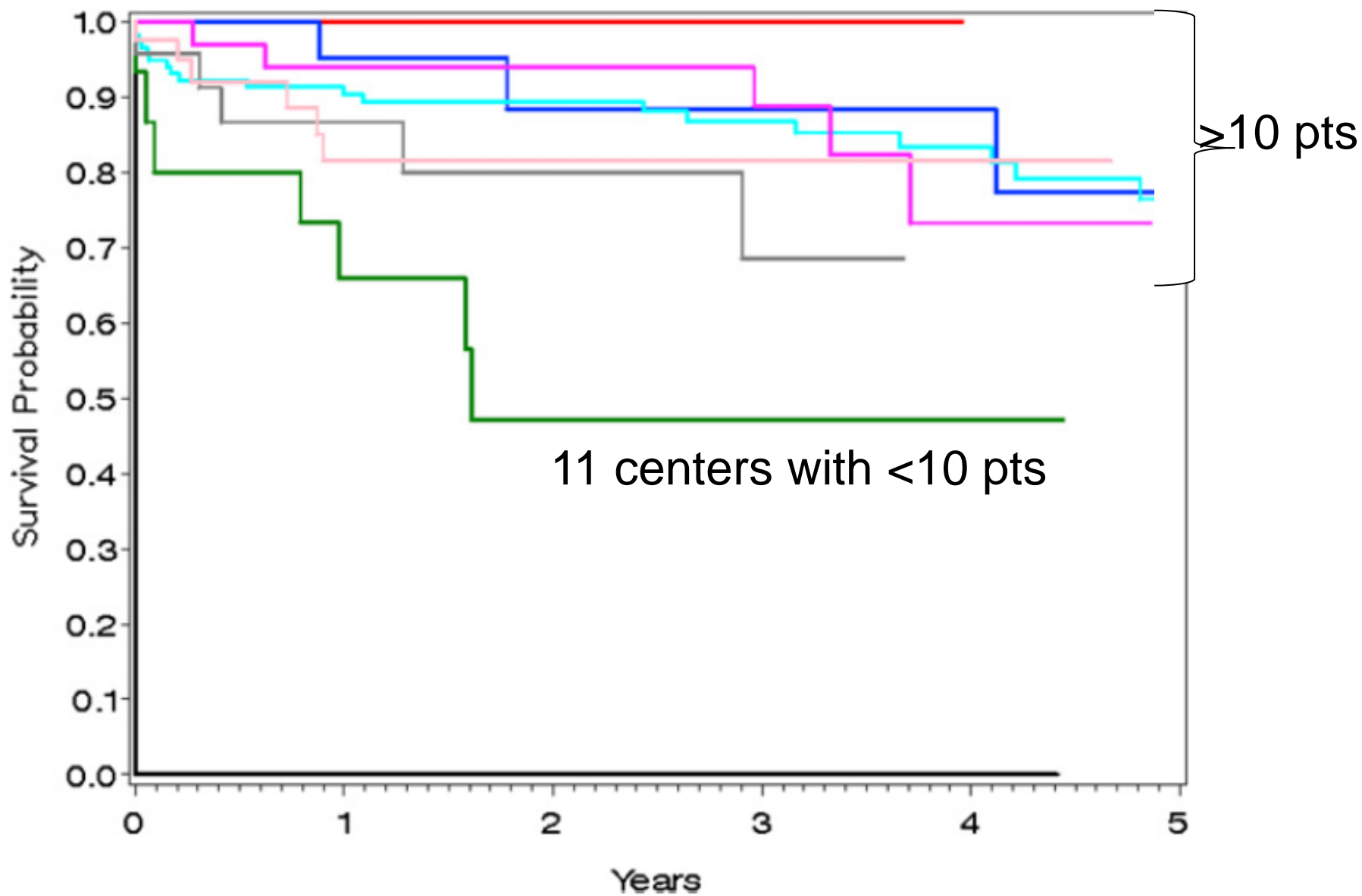


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Table 1

Univariate analysis of prognostic factors.

Variable	Number	3-y survival (%)	5-y survival (%)	<i>p</i>
Center				
Best results	36	87	77	0.02
Worst results	9	47	45	

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Table 2

Multivariate analysis of prognostic factors for overall survival of 301, patients treated by cytoreductive surgery combined with perioperative intraperitoneal chemotherapy.

Variable	<i>p</i>	Hazard ratio	95% CI
Peritoneal index ^a	0.004	1.042	1.013–1.072
Center	<0.001	0.469	0.286–0.797
Histologic grade ^b	0.02	0.338	0.133–0.859
Sex	0.02	0.554	0.330–0.931
HIPEC vs EPIC	0.04	4.476	1.051–19.053

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- Surgical experience counts!
- CRS/HIPEC should be performed in highly specialized centers!

Institutional Learning Curve of Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemoperfusion for Peritoneal Malignancies

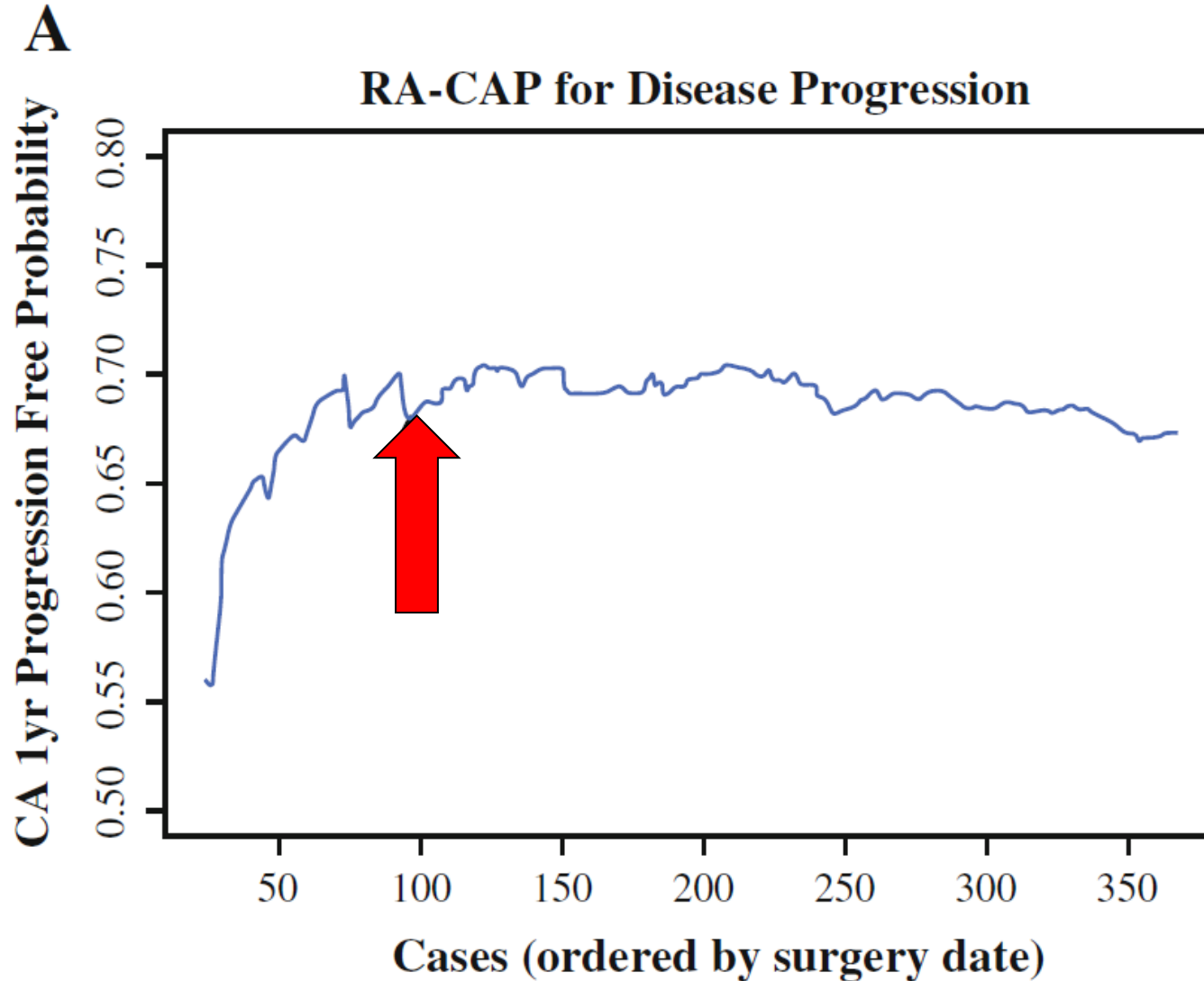
Patricio M. Polanco, MD¹, Ying Ding, PhD², Jordan M. Knox, BA¹, Lekshmi Ramalingam, MD¹, Heather Jones, MPA-C¹, Melissa E. Hogg, MD¹, Amer H. Zureikat, MD¹, Matthew P. Holtzman, MD¹, James Pingpank, MD¹, Steven Ahrendt, MD¹, Herbert J. Zeh, MD¹, David L. Bartlett, MD¹, and Haroon A. Choudry, MD¹

- **Division Surgical Oncology, Pittsburgh/USA**
- **N= 370**
- **Appendiceal neoplasms (80%)**
- **Assessment of learning curve**

Outcomes

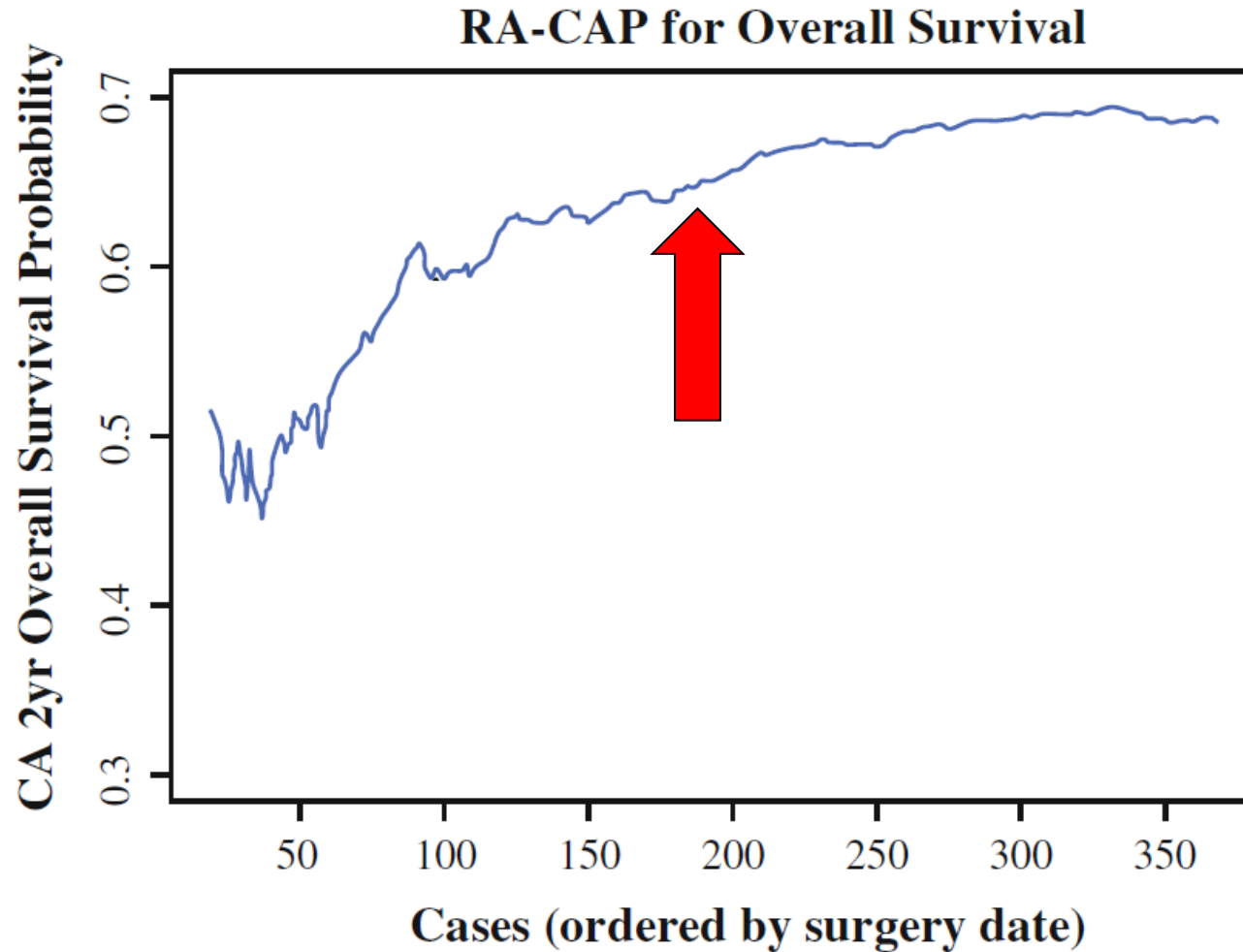
- Progression-free survival
- Overall survival

Progression-free Survival



Overall Survival

B



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- Best outcomes after 200 patients
- Steep and long learning curve!

Conclusions

- CRS/HIPEC: high-risk surgical procedure
- Relevant postoperative morbidity and mortality

Conclusions

- Increasing body of evidence supporting centralization of CRS/HIPEC
- Centralization is key to increase hospital-volume/surgeon-volume
- Steep/long learning curve (200 patients!!)
- Selected centers in Switzerland (and other countries!) should perform CRS/HIPEC

Centralization CRS/HIPEC

=> maximize efficacy

=> minimize morbidity

=> efficient health care delivery