



IRE for Pancreatic cancer

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DISCLOSURE

► Consultant

- Angiodynamics
- Boston Scientific
- Guerbet

IRE in pancreatic cancer

* off-label use



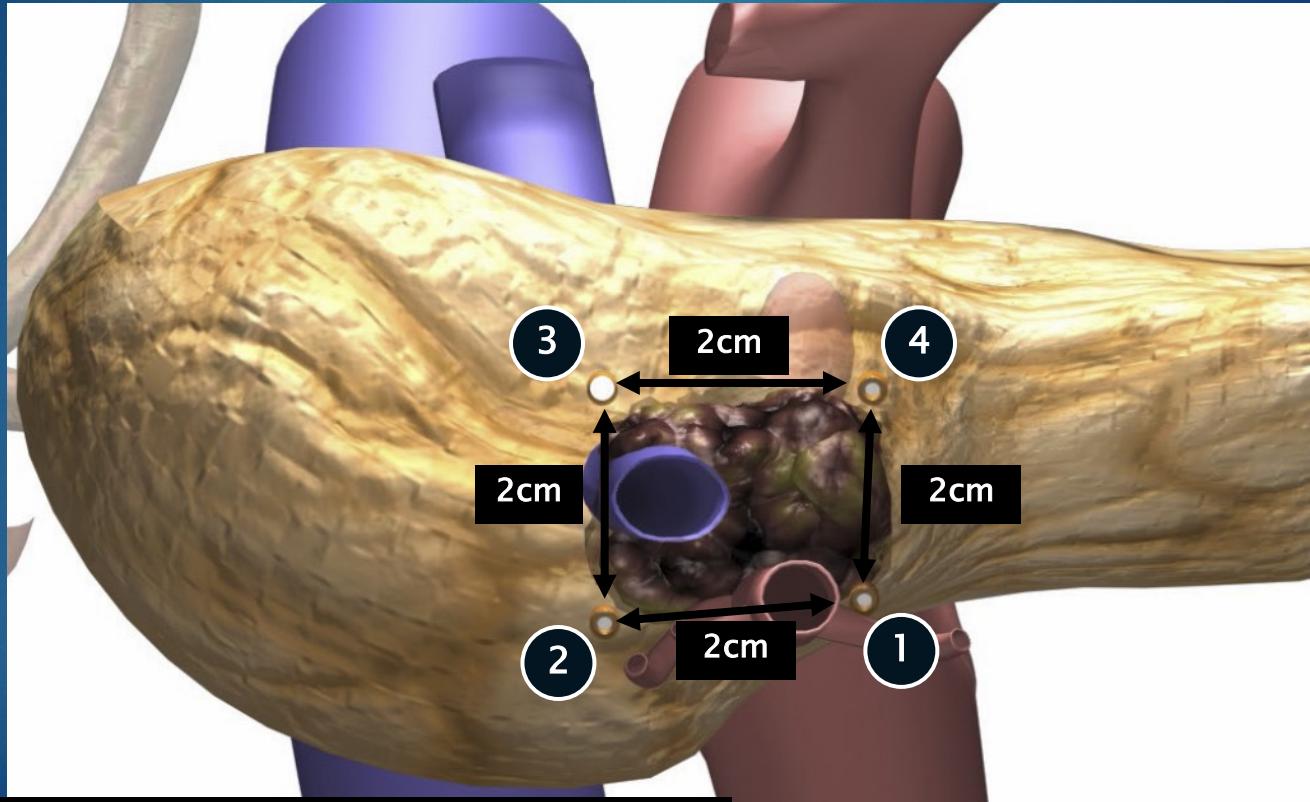
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IRE DEVICE



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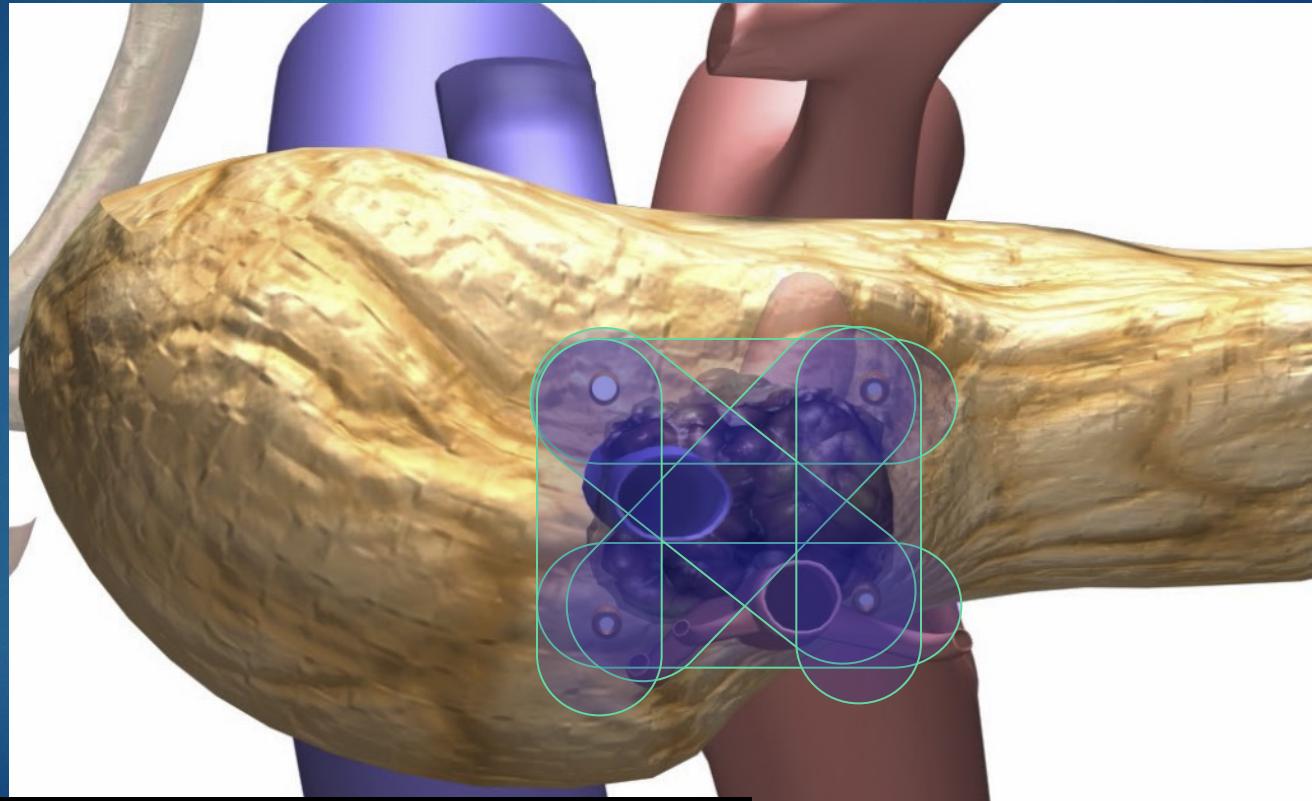
IRE Probe Spacing – Pancreatic Head



Courtesy : Dr.Robert Martin – J GI Surg

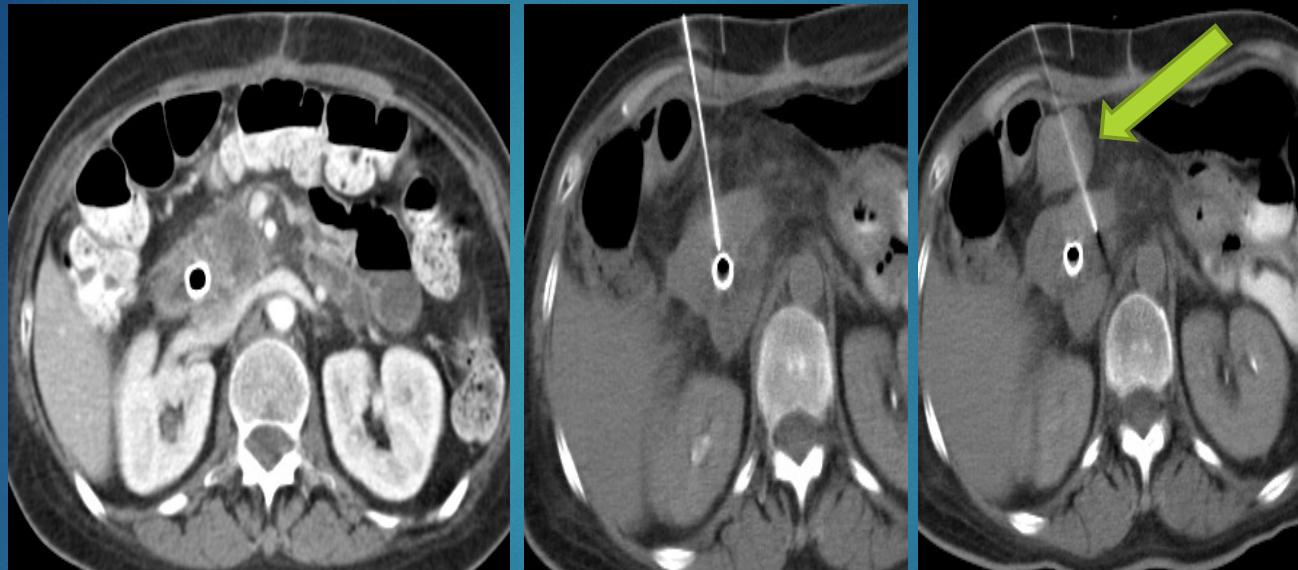
IRE Energy Delivery – Pancreatic Head

Energy: 3000V, 90us, with 1cm probe exposure



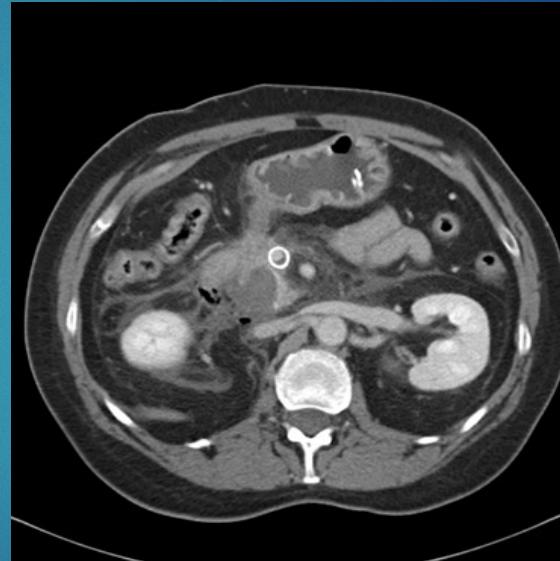
Courtesy DrRobert Martin – J GI Surg

IRE complications



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PANCREATITIS



Percutaneous IRE data

Percutaneous IRE for downstaging and control of unresectable pancreatic adenocarcinoma

Govindarajan Narayanan MD, Peter Hosein MD, Geetika Arora MD, Katuska Barbery MD, Tatiana Froud, MD, Alan Livingstone MD, Dido Franceschi MD, Caio M. Rocha Lima MD, Jose Yrizarry MD



2012



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“Percutaneous Image-Guided Irreversible Electroporation for the treatment of Unresectable, Locally Advanced Pancreatic Adenocarcinoma”

Govindarajan Narayanan, M.D.; Peter J Hosein , M.D.; Isabelle C Beulaygue, Ph.D. ; Tatiana Froud , M.D.; Hester J Scheffer, M.D.; Shree R Venkat, M.D.; Ana M Echenique , M.D.; Elizabeth C Hevert, M.D.; Alan S Livingstone , M.D.; Caio M Rocha-Lima , M.D.; Jaime R Merchan , M.D.; Joseph U Levi , M.D.; Jose M Yrizarry, M.D.; Riccardo Lencioni , M.D.



2017



OBJECTIVES

- The primary objective was to assess the **safety profile** of the procedure, the secondary objective to determine **overall survival (OS)**.
- All patients had prior chemotherapy (1-5 lines, median 2) and **30 of 50 (60%)** had prior radiation therapy.
- Follow-up included CT at 1 month and at 3-month intervals thereafter.
- The **median time from diagnosis to IRE** was **11.6 months**

RESULTS

Median OS was 27.0 months (95% confidence interval [CI], 22.7-32.5 months) from the time of diagnosis and 14.2 months (95% CI, 9.7-16.2 months) from the time of IRE

There was no treatment-related deaths and no 30-day mortality

IDEAL PATIENT FOR PERCUTANEOUS IRE OF PANCREAS

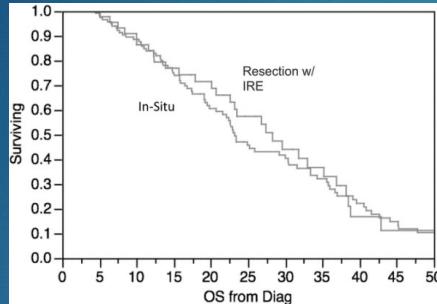
- ▶ Stage 3
- ▶ ECOG 0-1
- ▶ Safe access to reach tumor
- ▶ Has completed atleast one line of chemotherapy
- ▶ Size < 3 cms



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Survival – the US experience

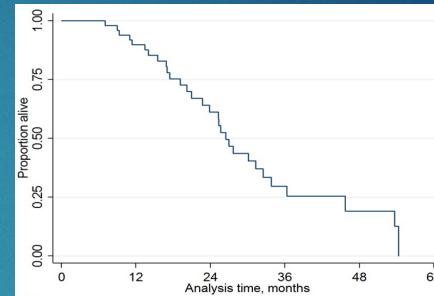
LOUISVILLE



Open IRE
OS 24.9 months

Treatment of 200 Locally Advanced (Stage III) Pancreatic Adenocarcinoma Patients With Irreversible Electroporation: Safety and Efficacy. Martin, Robert, II MD, PhD; et al Annals of Surgery. 262(3):486-494, September 2015.

MIAMI



Percutaneous IRE
OS 27.0 months

Percutaneous Image-Guided Irreversible Electroporation for the Treatment of Unresectable, Locally Advanced Pancreatic Adenocarcinoma. Govindarajan Narayanan, MD, et al Accepted for publication in JVIR



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Journal of Gastrointestinal Oncology

Percutaneous irreversible
electroporation with systemic
treatment for locally advanced
pancreatic adenocarcinoma

Edward Leen , John Picard, Justin Stebbing , Mark Abel , Tony Dhillon , Harpreet Wasan

<http://dx.doi.org/10.21037/jgo.2018.01.14>

Results

- ▶ Post-procedural immediate and 30-day mortality rates were both zero
- ▶ All-grade adverse events were 25%
- ▶ Median in-patient stay was 1 day (range 1–5 days)
- ▶ Median OS and PFS post-IRE for LAPC were 27 and 15 months respectively
- ▶ Four patients with LAPC down-staged post-IRE ablation to be surgically resectable, with R0 resections in 3 cases



[ORIGINAL ARTICLE]

Irreversible Electroporation for Nonthermal Tumor Ablation in Patients with Locally Advanced Pancreatic Cancer: Initial Clinical Experience in Japan

Katsutoshi Sugimoto¹, Fuminori Moriyasu², Takayoshi Tsuchiya¹, Yuichi Nagakawa³,
Yuichi Hosokawa³, Kazuhiro Saito⁴, Akihiko Tsuchida² and Takao Itoi¹



Results

Median time to local progression after IRE 12 months

Median OS after IRE 17.5 months after IRE

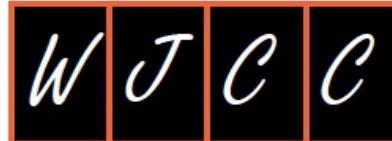
Median OS from diagnosis 24 months

4 major complications in 3 patients

No patient deaths within 90 days post IRE

Comparison

Study	n	Median OS from IRE Months	Median OS from diagnosis- Months
Meijerink	50	10	17
Narayanan	50	14.2	27
Leen	75	15	27
Sugimoto	8	17.5	24



*World Journal of
Clinical Cases*

Submit a Manuscript: <https://www.f10publishing.com>

World J Clin Cases 2020 November 26; 8(22): 5564-5575

DOI: [10.12998/wjcc.v8.i22.5564](https://doi.org/10.12998/wjcc.v8.i22.5564)

ISSN 2307-8960 (online)

ORIGINAL ARTICLE

Clinical Trials Study

Gemcitabine plus concurrent irreversible electroporation vs gemcitabine alone for locally advanced pancreatic cancer

Yang-Yang Ma, Yin Leng, Yan-Li Xing, Hong-Mei Li, Ji-Bing Chen, Li-Zhi Niu



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RESEARCH ARTICLE

Open Access

Irreversible electroporation versus radiotherapy after induction chemotherapy on survival in patients with locally advanced pancreatic cancer: a propensity score analysis

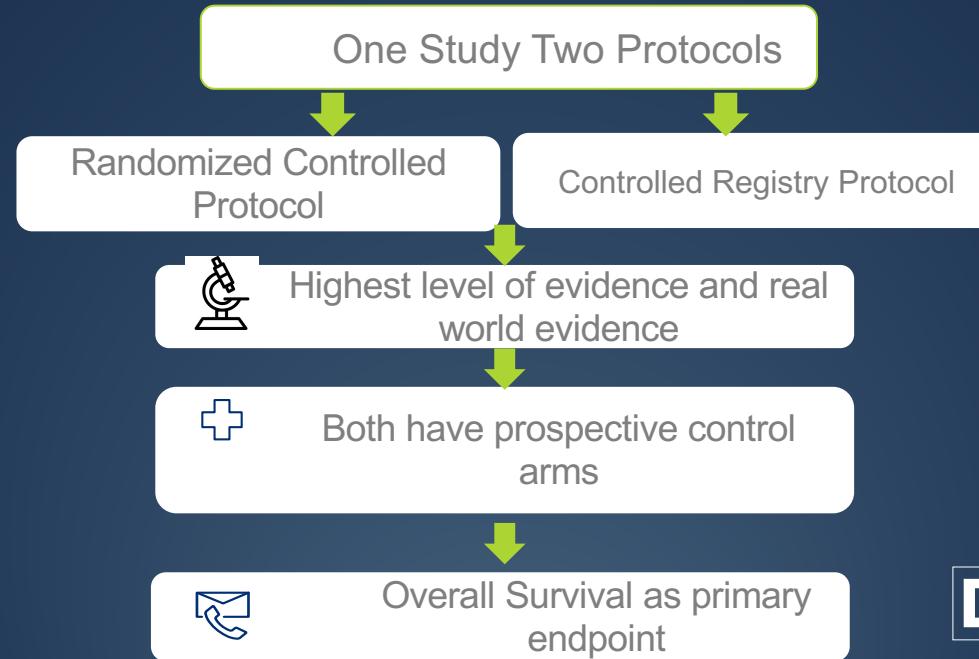


Chaobin He^{1†}, Jun Wang^{1,2†}, Shuxin Sun^{1†}, Yu Zhang³, Xiaojun Lin¹, Xiangming Lao¹, Bokang Cui¹ and Shengping Li^{1*}

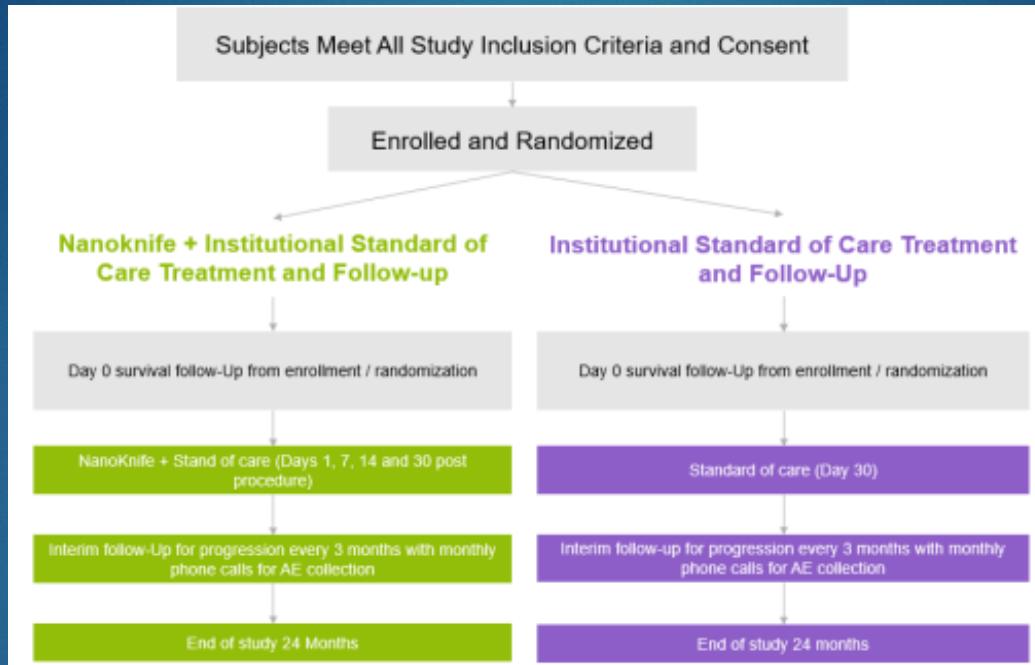


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DIRECT: Data for IRE Cancer Treatment



RCT Design



Future directions

Irreversible electroporation reverses resistance to immune checkpoint blockade in pancreatic cancer

• Jun Zhao¹ , Xiaofei Wen^{1,2,3} , Li Tian⁴, Tingting Li^{1,5},
Chunyu Xu⁶, Xiaoxia Wen¹, Marites P. Melancon⁴,
Sanjay Gupta⁴, Baozhong Shen^{2,3},
Weiyi Peng  orcid.org/0000-0002-7785-6240⁶ &
Chun Li  orcid.org/0000-0002-2376-4703¹

Nature Communications **Volume 10**, Article number: 899 (2019)



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Summary

- ▶ Prospective and Retrospective studies have established safety
- ▶ Multiple studies indicate a survival benefit
- ▶ Registry and RCT will help further define the role of IRE in pancreatic cancer



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Thank you

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