Prostate trials – past and the future

Prof. Janusz Skowronek, MD, PhD,

Brachytherapy Department, Greater Poland Cancer Centre,

Electroradiology Department, University of Medical Sciences, Poznan, Poland

www.wco.pl/zb

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ZAKŁAD BRACHYTERAPII
WIELKOPOLSKIE CENTRUM ONKOLOGII

Radium? – no way….

RADIUM A 'FRAUD,' ASSERTS DR. DOYEN

And He Says That Most Physicians Who Urge Its Use to Cure Cancer Are Charlatans.

HE CHARGES EXPLOITATION

Paris Physician Challenges the Radio-Therapists to Produce One Real Case of Cancer Cure.

Special Cable to THE NEW YORK TIMES.

He challenged the radio-therapists to produce a single person cured of a real cancer. He concluded with the sensational statement that radium was nothing but a gigantic fraud,

"I am willing to go so far as to state that a physician, continuing to employ radium for a long period, is either abusing public confidence or is culpably ignorant. I am willing to state that the majority of such physicians are nothing but charlatans—

"I think it a fact that Americans are accustomed to do innumerable stupid things for the sake of a new thing, but time will teach them wisdom and justify my words."

The New York Times
Published: April 19, 1914

Prostate cancer - treatment

Surgery

- Nerve Sparing Prostatectomy – 1998
- Prostatectomy Laparoscopic – 2000
- Prostatectomy Robotic - 2003

Radiotherapy

- Ig-TRUS LDR Seeds – 1987
- IG-IMBT HDR – 1991
- EBRT 3D- conformal – 1992
- EBRT A-IGRT – 1996
- EBRT Intensity Modulated - 1999

Radiotherapy

External Beam Radiation Therapy (EBRT)

- EBRT 2D
- Conformal EBRT 3D
- EBRT IMRT
- EBRT IGRT
- Tomotherapy
- Cyberknife
- Protons

Brachytherapy (BT)

- BT HDR (High-Dose–Rate)
- BT LDR (Low-Dose-Rate)
- BT ultra LDR (seeds)
- BT PDR (Pulsed-Dose-Rate)

+/-

- Hiperthermia

Physician, patients choice

Results

QoL

Costs

Prostatectomy

*simple

*nerve sparing

*laparoscopy

*robotic (Da Vinci)

EBRT:

* 3D

*IMRT

*Hypofractionation

*IGRT

*Tomotherapy

*Cyberknife

*Protons

Brachytherapy:

*ultraLDR (seeds)

*HDR

*PDR

+/- hyperthermy

*HIFU

*Criotherapy

*Nanoknife

*Hormontherapy

*Chemiotherapy

*Watchful Waiting

*Active Surveillance

Results – not possible to compare?

From:

„Comparing Treatment Results Of PROSTATE CANCER”

Prostate Cancer Results Study Group 2016

Peter Grimm, DO

Prostate Cancer Center of Seattle

BJUI SUPPLEMENTS

Comparative analysis of prostate-specific antigen free survival outcomes for patients with low, intermediate and high risk prostate cancer treatment by radical therapy. Results from the Prostate Cancer Results Study Group

Peter Grimm[1], Ignace Billiet[2], David Bostwick[3], Adam P. Dicker[4], Steven Frank[5], Jos Immerzeel[6], Mira Keyes[7], Patrick Kupelian[8], W. Robert Lee[9], Stefan Machtens[10], Jyoti Mayadev[11], Brian J. Moran[12], Gregory Merrick[13], Jeremy Millar[14], Mack Roach[15], Richard Stock[16], Katsuto Shinohara[15], Mark Scholz[17], Ed Weber[18], Anthony Zietman[19], Michael Zelefsky[20], Jason Wong[21], Stacy Wentworth[22], Robyn Vera[23] and Stephen Langley[24]

[1]Prostate Cancer Center of Seattle, WA, USA, [2]Urology Centre Kortrijk, Belgium, [3]Bostwick Laboratories, Glen Allen, VA, USA, [4]Jefferson Medical College of Thomas Jefferson University, Philadelphia, PA, USA, [5]MD Andersen Center, Houston, TX, USA, [6]The Prostate Clinic, Utrecht, The Netherlands, [7]BC Cancer Agency Vancouver Center, Vancouver, BC, Canada, [8]UCLA, Los Angeles, CA, USA, [9]Duke University Medical Center, Durham, NC, USA, [10]Department of Urology, Marien-Krankenhaus, Bergisch Gladbach, Germany, [11]University of California, Davis, CA, USA, [12]Chicago Prostate Center, Westmont, IL, USA, [13]Urologic Research Institute, Wheeling Jesuit University, WV, USA, [14]Alfred Health and Monash Univeristy, Melbourne, Australia, [15]University of California, San Francisco, CA, USA, [16]Mt Sinai Medical Center, New York, USA, [17]Prostate Cancer Research Institute, Los Angeles, CA, USA, [18]Prostate Cancer Center of Seattle, WA, USA, [19]Harvard Medical School, Boston, MA, USA, [20]Memorial Sloan Kettering Cancer Center, New York, USA, [21]University of California, Irvine, CA, USA, [22]Piedmont Radiation Oncology, Greensboro, NC, USA, [23]Virginia Commonwealth University, Richmond, VA, USA, and [24]Department of Urology, Royal Surrey County Hospital, Guildford, UK

BJU International 2012; 109, supplement 1, 22–29

What ’ s known on the subject? and What does the study add?

- Very few comparative studies to date evaluate the results of treatment options for prostate cancer using the most sensitive measurement tools.
- PSA has been identified as the most sensitive tool for measuring treatment effectiveness.
- To date, comprehensive unbiased reviews of all the current literature are limited for prostate cancer.

- **This is the first large scale comprehensive review of the literature comparing risk stratified patients by treatment option and with long-term follow-up.**

- The results of the studies are weighted, respecting the impact of larger studies on overall results.
- The study identified a lack of uniformity in reporting results amongst institutions and centres.

Conclusions

- 44.900+ prostate studies were published between 2000 and 2015.
- 1.415 of those studies featured treatment results.
- 208 of those met the criteria to be included in this review study.
- Some treatment methods are under-represented due to failure to meet criteria.

The role of brachytherapy should be considered for most men with localized prostate cancer

- Outcomes probably better than with other local treatments
- Consider adding EBRT and/or ADT for higher risk disease
- Seeds or HDR brachytherapy?

Comparing Treatment Results of PROSTATE CANCER

Prostate Cancer Results Study Group - June 2016

Treatment Symbols Ledger- for all risk groups graphs

Brachytherapy

- Brachytherapy alone
- Brachytherapy & EBRT
- Brachytherapy, EBRT, & ADT
- HDR (Brachytherapy)
- HDR & ADT (Brachytherapy)

EBRT/IMRT

- EBRT alone
- EBRT & ADT
- Hypo EBRT

Protons

- Protons

Surgery

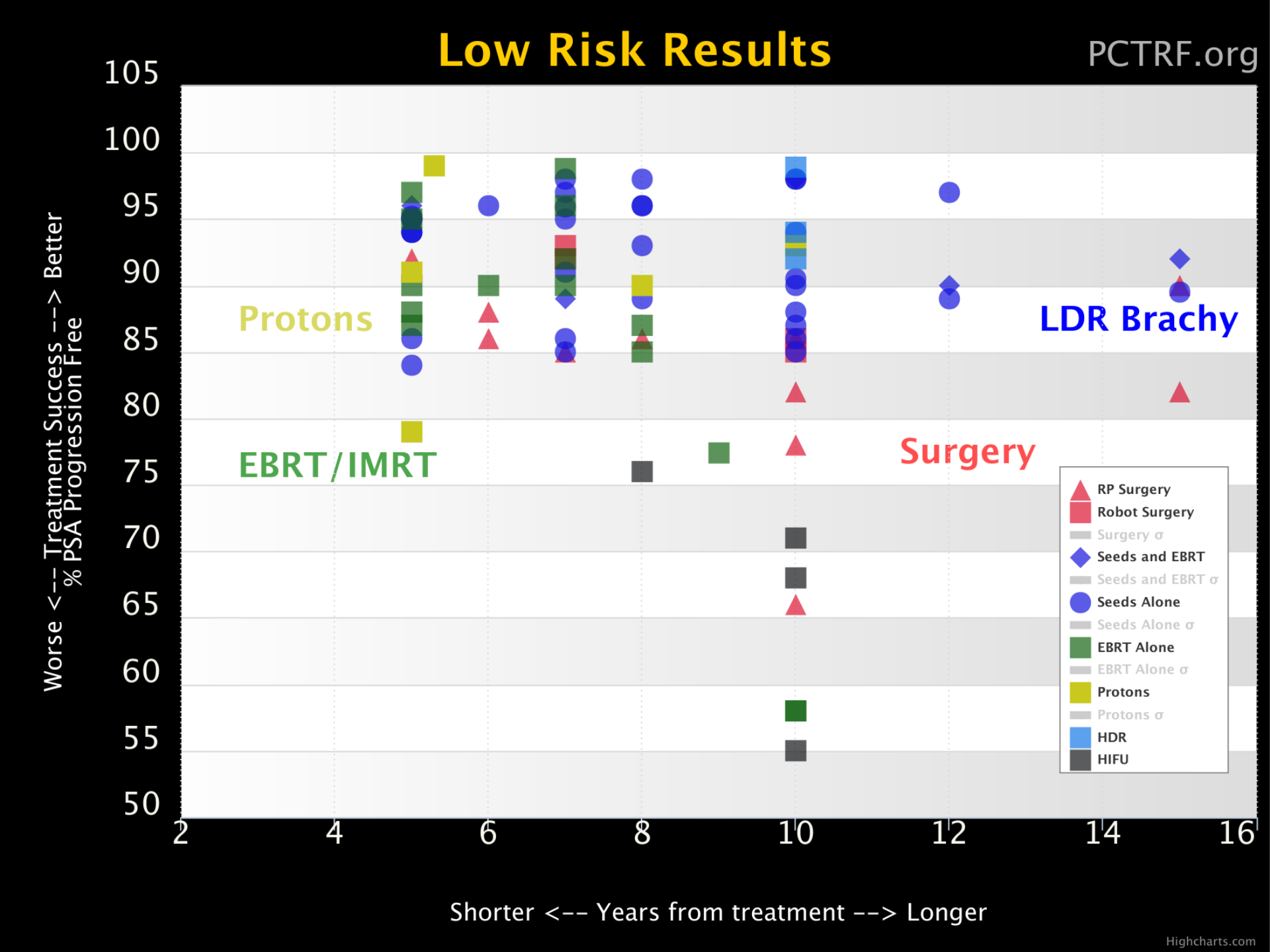
- RP Surgery
- Robotic Surgery
- RP Surgery & EBRT

Cryotherapy

- Cryotherapy

HIFU

- HIFU


Low Risk Results
PCTRF.org
Worse <-- Treatment Success --> Better
% PSA Progression Free
105
100
95
90
85
80
75
70
65
60
55
50
2
4
6
8
10
12
14
16
Shorter <-- Years from treatment --> Longer
Protons
LDR Brachy
EBRT/IMRT
Surgery
RP Surgery
Robot Surgery
Surgery σ
Seeds and EBRT
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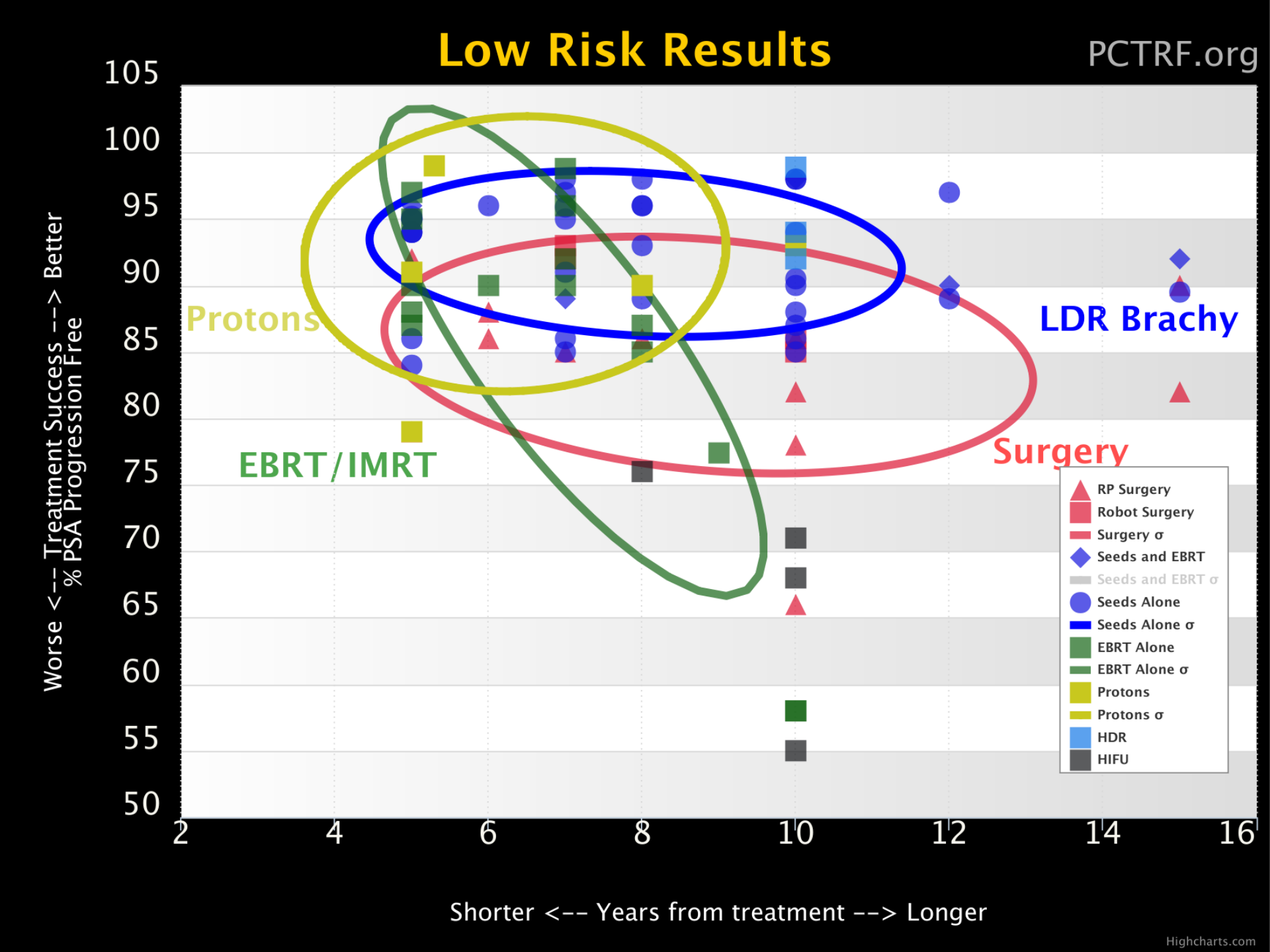
Seeds Alone
Seeds Alone σ
EBRT Alone
EBRT Alone σ
Protons
Protons σ
HDR
HIFU
Highcharts.com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EBRT Alone
EBRT Alone σ
Protons
Protons σ
HDR
HIFU
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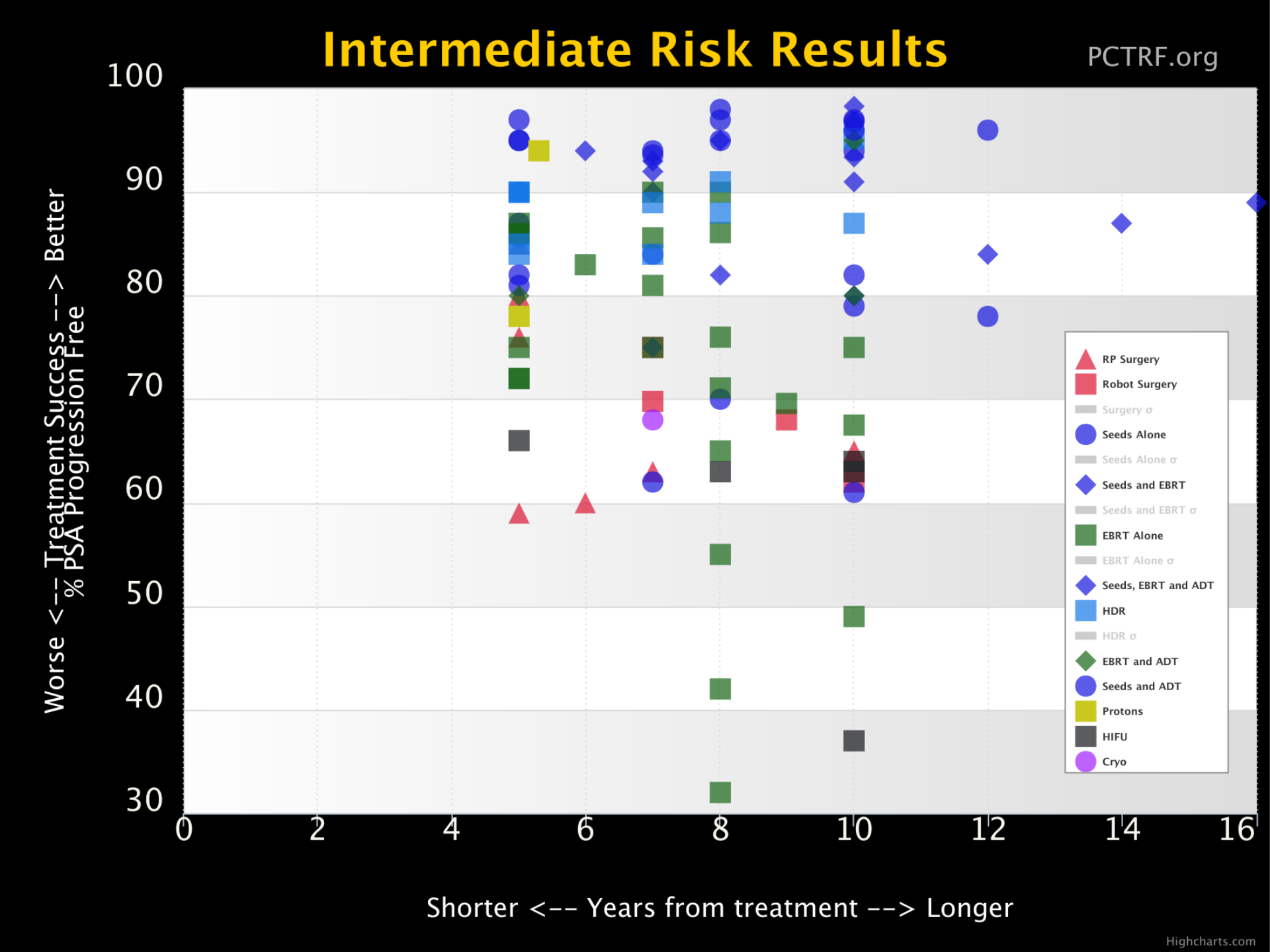
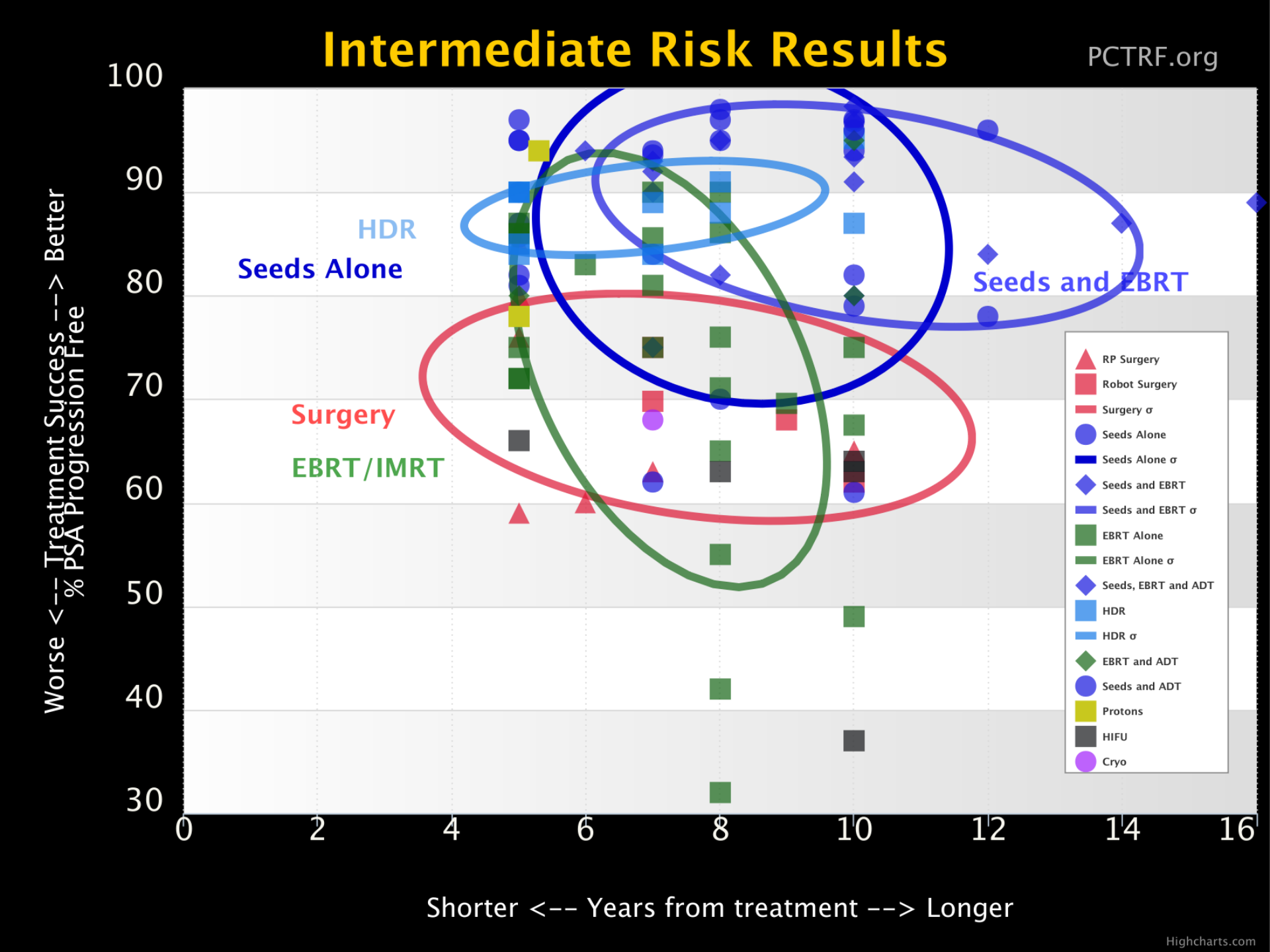
Intermediate Risk Results

PCTRF.org

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EBRT and ADT
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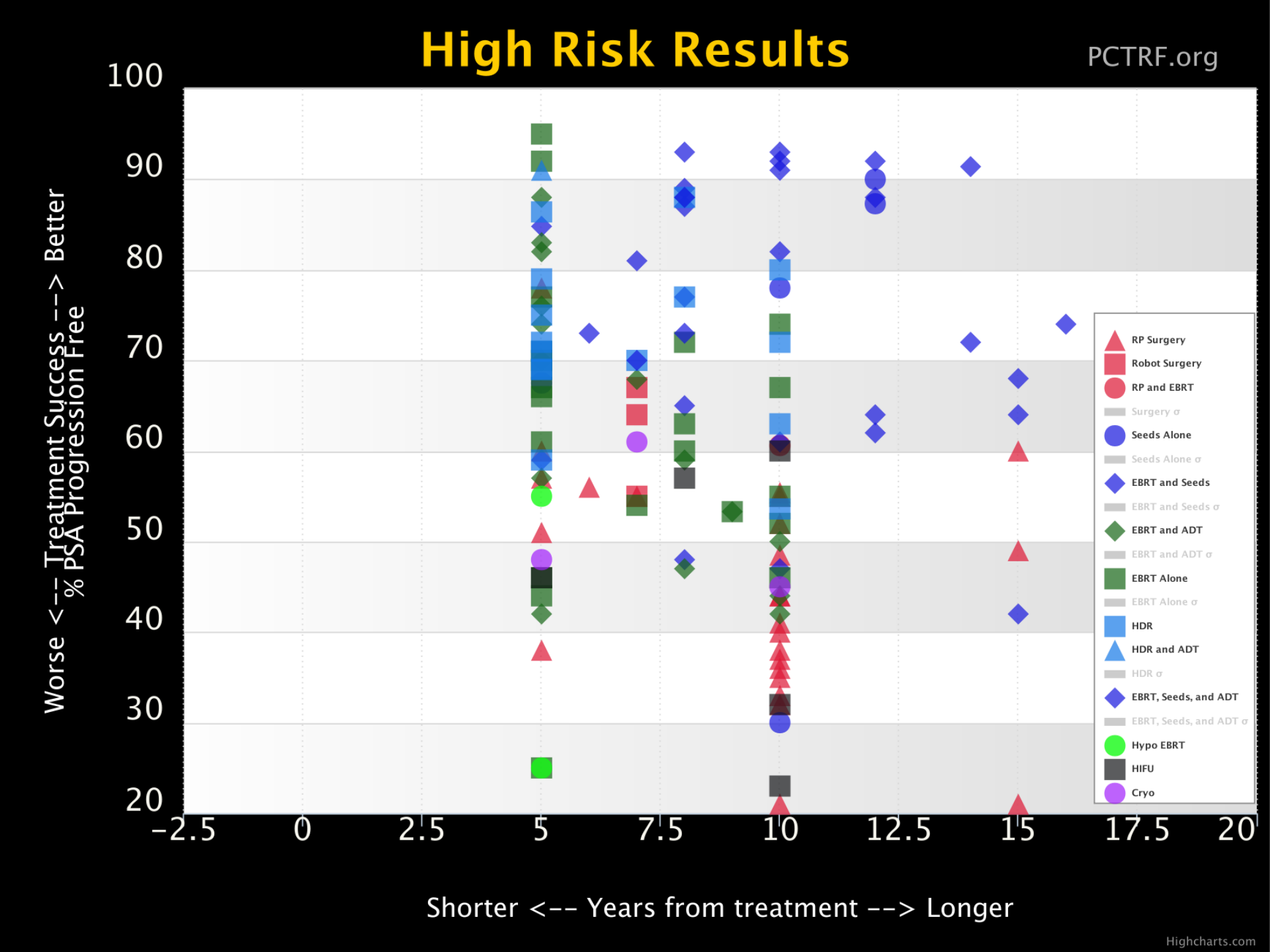
Cryo
Highcharts.com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Robot Surgery
RP and EBRT
Surgery σ
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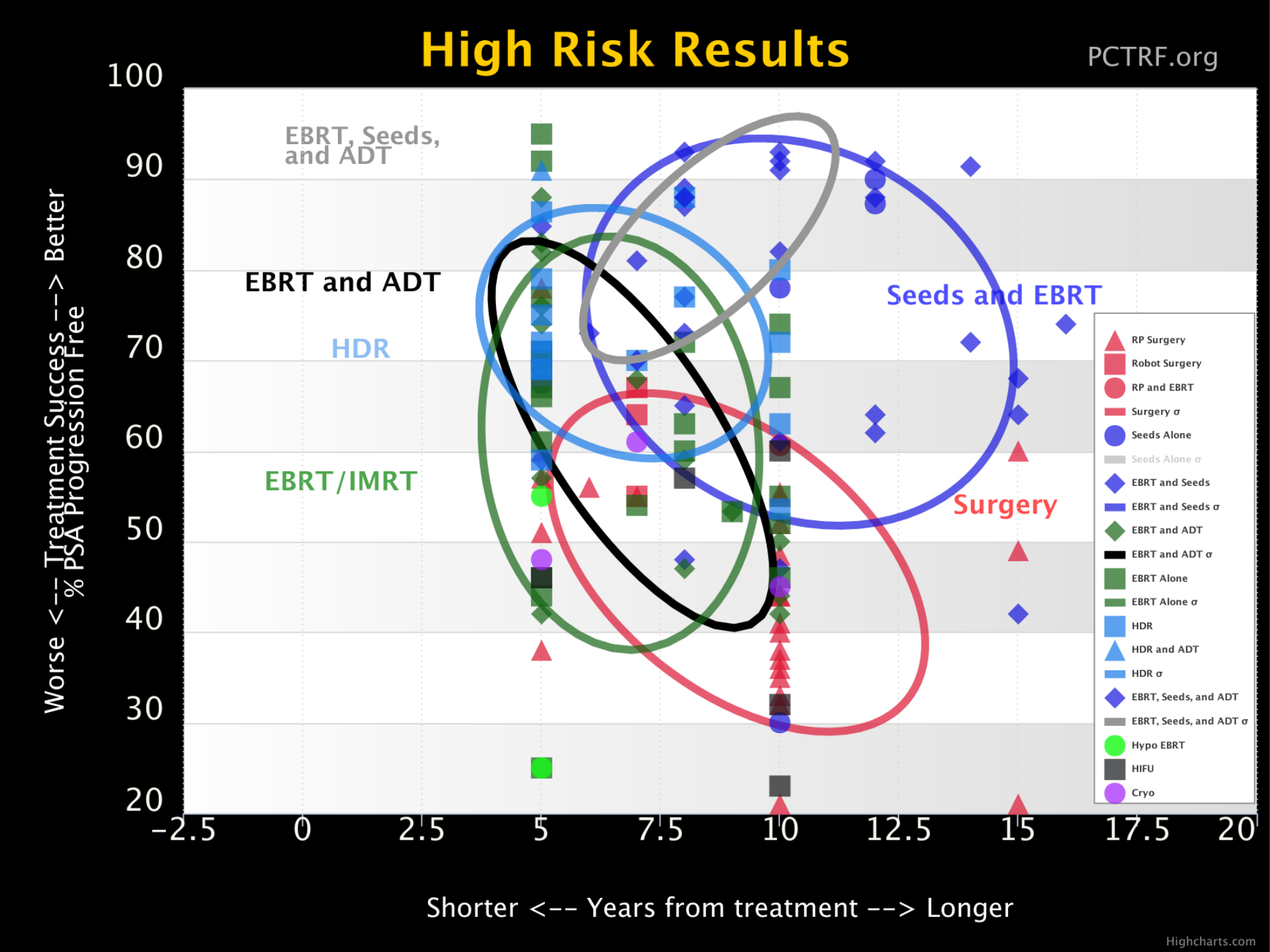
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Highcharts.com

Summary evidence prostate cancer

- **Low Risk**

  BT is as effective as EBRT or RPE (or AS >65 y)

  different morbidity/PRO profiles

- **Intermediate Risk**

  BT+EBRT** (BT alone) at least as effective as EBRT alone** or RPE*

  different morbidity/PRO profiles

- **High Risk**

  BT+EBRT** superior to RPE or EBRT alone***

*I-125 LDR or Ir 192 HDR BT

**Hormonal treatment, as indicated, is not considered here

ASTRO 2016

Bradley Prestidge, Past – President ABS, Bon Secours Cancer Institute at DePaul Medical Center in Norfolk, Virginia

Phase III Trial

Brachytherapy alone can control intermediate-risk prostate cancer

- **579 patients (median age – 67 years), intermediate-risk , T1c (67%) - T2b, Gleason score – 2 - 6, PSA 10 ng/ml – 20 ng/ml, or Gleason score 7 and PSA < 10 (89%),**
- **Group I - BT only – 292 patients, I-125 or Pd-103, 146 Gy,**
- **Group II – Combined treatment – 287 patients (EBRT 45 Gy) + I-125 or Pd-103, 110 Gy,**
- **Follow-up (median) – 6.7 years,**

PFS – Group I – 86%, 5 years follow-up,

Group II - 85%, 5 years follow-up, p = 0.0006

ASTRO 2016

Bradley Prestidge, Past – President ABS, Bon Secours Cancer Institute at DePaul Medical Center in Norfolk, Virginia

- **The addition of external beam therapy to brachytherapy did not significantly extend PFS among men with intermediate-risk prostate cancer**
- **Additionally – lower complication rate in the group I**

"This means men with intermediate-risk prostate cancer may be quite well managed with brachytherapy alone" - Prestidge

ASCENDE-RT trial

Morris WJ, Tyldesley S, Pai HH, et al.

A multicenter, randomized trial of dose-escalated external beam radiation therapy (EBRT-B) versus low-dose-rate brachytherapy (LDR-B) for men with unfavorable-risk localized prostate cancer.

BC Cancer Agency: Vancouver, Vancouver Island, Southern Interior, and Fraser Valley Centers, BC
Sunnybrook Cancer Centre, Princess Margaret Hospital, Toronto, Ontario

ASCENDE-RT

Androgen Suppression Combined with Elective Nodal and Dose Escalated Radiation Therapy

- **ASCENDE-RT trial is the first and only existing randomized comparison of low-dose-rate prostate brachytherapy (LDR-PB) for prostate cancer with any other method of curative radiation therapy.**

Results presented on 2015 ASCO Annual Meeting and ABS 2015

ASCENDE-RT trial

Learning objectives

- **To be aware of first reported RTC of dose escalated EBRT vs. LDR prostate boost *("triple therapy")* in High-Tier Intermediate and High Risk pCa**

- **To describe:**
  - **Clinical and PSA outcomes**
  - **Incidence and prevalence of late GU and GI toxicity in this population**

ASCENDE-RT trial

ASCENDE-RT RTC

NCCN IR and HR risk group

↓

Randomized

DE-EBRT arm
12m ADT, 8m neo-adjuvant
46 Gy whole pelvis EBRT
78 Gy 3-DCRT boost

LDR-PB arm
12m ADT, 8m neo-adjuvant
46 Gy whole pelvis EBRT
LDR 115 Gy I^{125} boost

FU:
Clinical visits: q6 mo – to 5 y and annually afterwards
PSA and Testosterone - q6mo

BC Cancer Agency
CARE + RESEARCH
An agency of the Provincial Health Services Authority

ASCENDE-RT trial

Eligibility criteria

- **NCCN intermediate or high risk pCa**
  - Negative metastatic work-up
    - Bone scan/CT GS 8-10
    - or Initial PSA (iPSA) 20-40 ng/mL
- **Exclusions:**
  - **iPSA >40**
  - prior TUPR
  - Unfit for GA or spinal
  - **cT-Stage ≥T3b**
  - TRUS prostate volume >75 cm^3

ASCENDE-RT trial

Endpoints

- **Primary:**
  - Biochemical Progression Free Survival (PFS)
    - (Phoenix- nadir +2 ng/ml)
- **Secondary:**
  - Overall survival
  - Metastasis-free survival
  - Acute and late toxicity
  - Quality of Life
  - Testosterone recovery

ASCENDE-RT trial

Accrual

– **398 pts accrued**

- 39 radiation oncologists working in 6 Canadian cancer centers, ~ 50% by 5 Rad Oncs at 3 centers

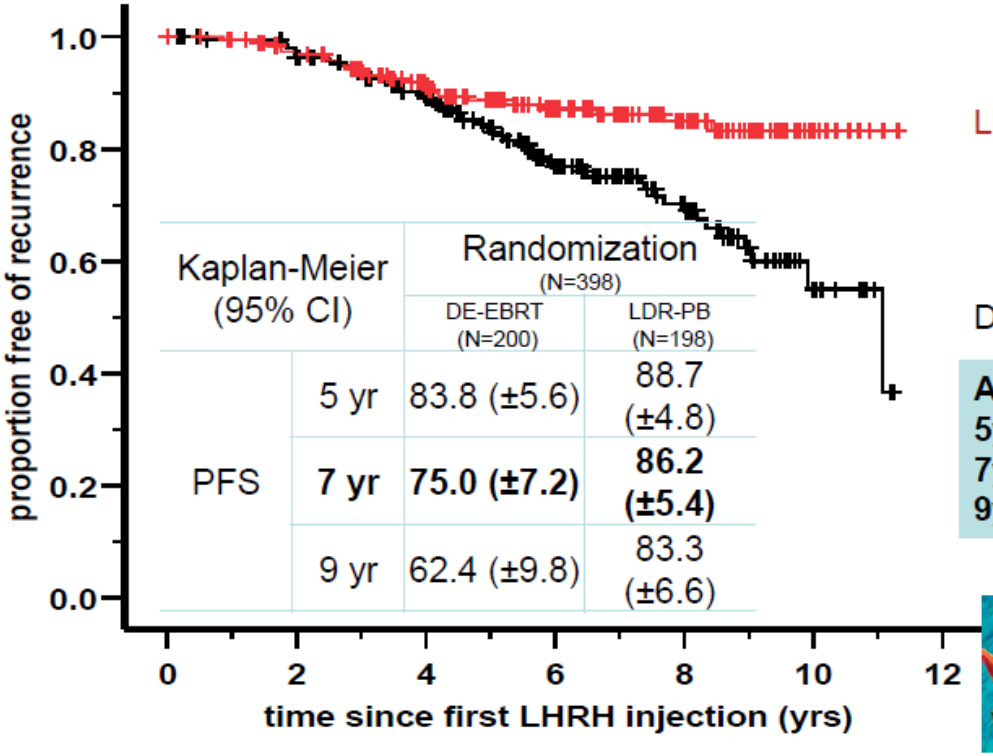
– **Median Follow-up**

- 6.5 y after ADT started *or*
- 5 y after treatment completion (~18 mo after starting ADT)
  - Maximum: 11y

ASCENDE-RT trial

Results: Biochemical PFS

Intent-to-treat analysis of the primary endpoint

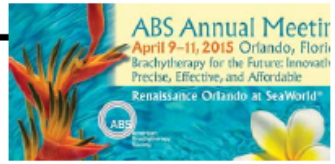


LDR-PB ARM

DE-EBRT ARM

Kaplan-Meier (95% CI)		Randomization (N=398) DE-EBRT (N=200)	LDR-PB (N=198)
PFS	5 yr	83.8 (±5.6)	88.7 (±4.8)
	7 yr	**75.0 (±7.2)**	**86.2 (±5.4)**
	9 yr	62.4 (±9.8)	83.3 (±6.6)

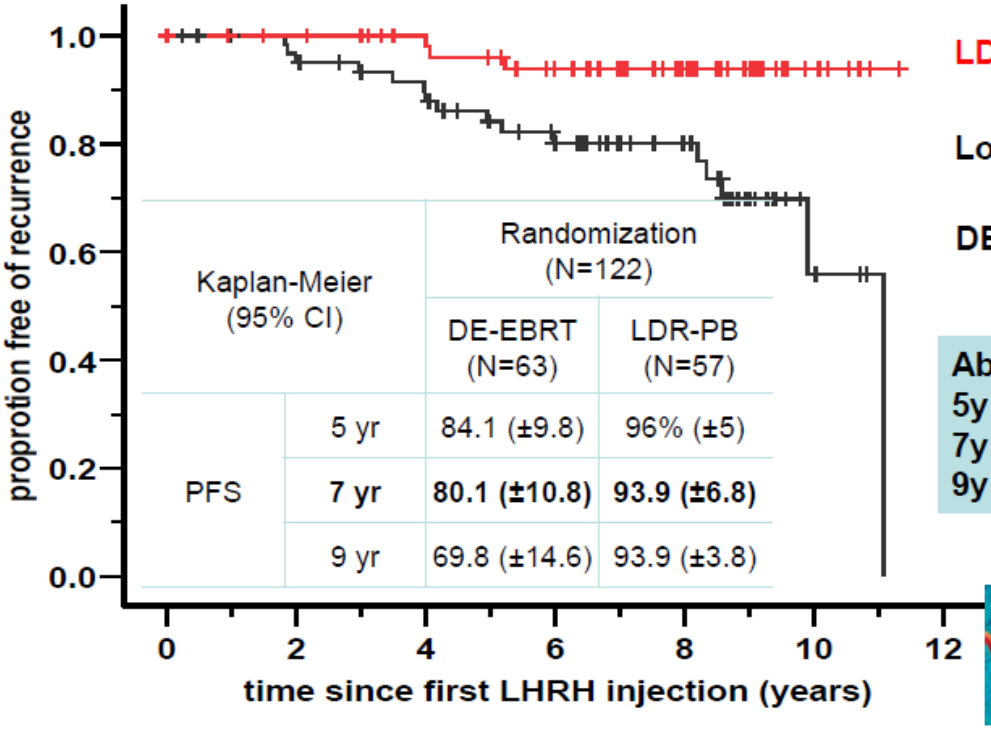
Absolute difference
5y – 4.9%
7y – 11.2%
9y – 20.95%



ASCENDE-RT trial

PFS by NCCN Risk Group

Intermediate-risk N=122



Kaplan-Meier (95% CI)		Randomization (N=122) DE-EBRT (N=63)	LDR-PB (N=57)
PFS	5 yr	84.1 (±9.8)	96% (±5)
	7 yr	**80.1 (±10.8)**	**93.9 (±6.8)**
	9 yr	69.8 (±14.6)	93.9 (±3.8)

LDR-PB ARM

Log rank P <0.001

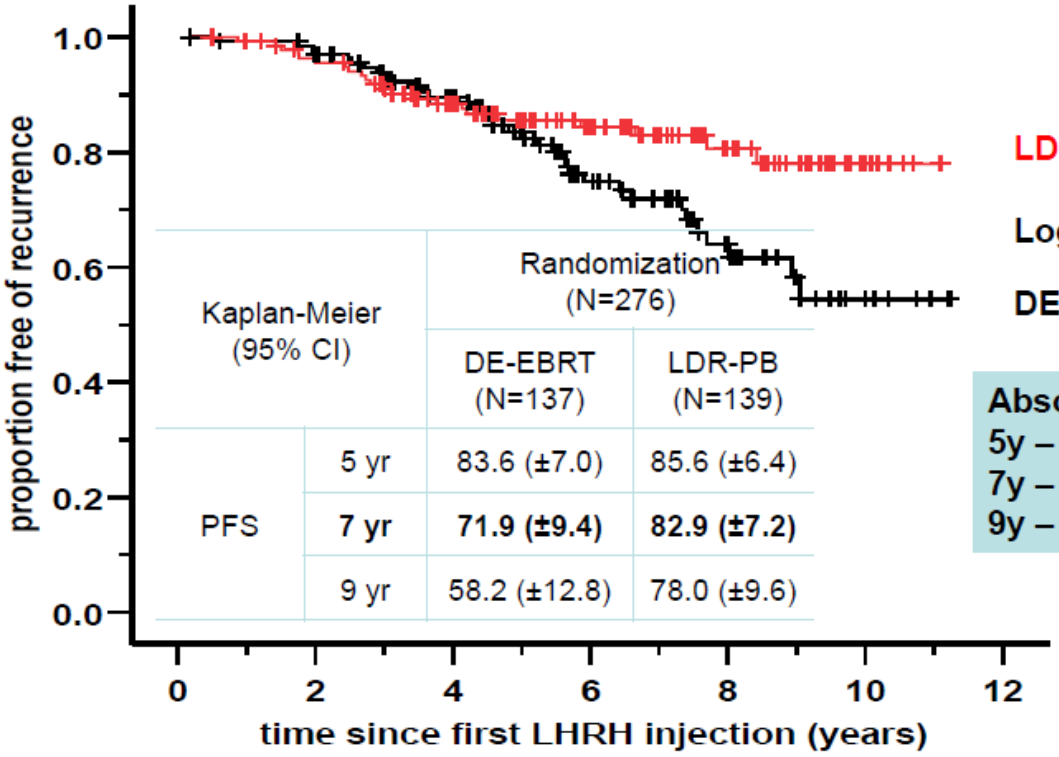
DE-EBRT ARM

Absolute difference
5y – 11.9%
7y – 13.8%
9y – 24.1%

ASCENDE-RT trial

PFS by NCCN Risk Group

High-Risk N=276



Kaplan-Meier (95% CI)		Randomization (N=276) DE-EBRT (N=137)	LDR-PB (N=139)
PFS	5 yr	83.6 (±7.0)	85.6 (±6.4)
	7 yr	**71.9 (±9.4)**	**82.9 (±7.2)**
	9 yr	58.2 (±12.8)	78.0 (±9.6)

LDR-PB ARM

Log rank P = 0.05

DE-EBRT ARM

Absolute difference
5y – 2%
7y – 11.%
9y – 19.8%

ASCENDE-RT trial

Summary
6 Year Prevalence of Late Toxicity

- **Gr 0-1 (minimal or no toxicity)**
  - **GI** - 95% of patients in both arms
  - **GU** - 90% in DE-EBRT vs 80% in LDR-PB

- **Gr 3+ GU**
  - 2.2 vs 8.6% in DE-EBRT vs LDR-PB

ASCENDE-RT trial

Conclusions

- At 6.5 years follow up, there was a large advantage in PSA progression-free survival for the patients assigned to the LDR-PB group, with a 50% reduction in failure rate compared to DE-EBRT group.

- PSA progression-free survival was 83% for high-risk and 94% for intermediate-risk patients, randomized to the LDR-PB arm

- The trial was not large enough to detect small differences in overall and cancer-specific survival, and to date there is no difference in these endpoints has been seen.

- However, existing trends favour LDR-PB and an overall survival advantage may emerge with longer follow-up.

- ASCENDE-RT has made an important contribution to overall treatment strategy for men with unfavourable prostate cancer and had provided benchmarks for future studies that may compare other radiation treatment modalities or surgery.

A comprehensive analysis of brachytherapy clinical trials over the past 15 years

Bismarck C.L. Odei, Dustin Boothe, Shane Lloyd, David K. Gaffney. Department of Radiation Oncology, David Geffen . School of Medicine at UCLA, Los Angeles, CA, Department of Radiation Oncology, University of Utah, Salt Lake City, UT.

Brachytherapy - (2016) in Article in Press

Data from clinicaltrials.gov website

using the search terms: Radiation Therapy, Brachytherapy, and associated terms.

- 10,417 CTs between 2000 and 2015.
- Trials not using **BT** were excluded;

yielding 319 CTs.

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Brachytherapy - (2016) in Article in Press

- The majority of the CTs were phase II (37%), involving interstitial BT (45%), and treating the prostate (36%).
- Nongovernmental institutions (NGIs) have funded the greatest number of CTs.
- New CTs involving radiotherapy of all types showed increase over time ($p < 0.05$), whereas no corresponding increase was seen in BT trials.
- New BT trials independently funded by industry have declined ($p = 0.01$).
- Collaboration between industry and NGIs was associated with greater likelihood of trial completion. Industry funding was associated with Phase IV trials, usage of surface BT, among others.

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Brachytherapy - (2016) in Article in Press

CONCLUSIONS:

- Trials examining radiotherapy have increased, whereas trials incorporating BT have remained unchanged.
- Collaboration between industry and NGIs was associated with a greater likelihood for successful trial completion.
- The role of BT can be better realized with greater incorporation into CTs.

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Brachytherapy - (2016) in Article in Press

Table 1
Characteristics of brachytherapy trials

Characteristics	*N* (319)	%
Primary site		
Gynecologic	94	29
Prostate	114	36
Breast	41	13
Gastrointestinal	30	9
Other	40	13
Type of brachytherapy		
Interstitial	144	45
Intracavitary	106	33
Intraluminal	28	9
Surface	23	7
Intraoperative	4	1
Multiple	12	4
Dose rate		
HDR	86	27
LDR	36	11
Both	26	8
Unspecified	171	54

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Brachytherapy - (2016) in Article in Press

Location		
North America	210	66
Europe	53	17
South America	5	2
Asia	33	10
Africa	2	1
Intercontinental	16	5
Trial phase		
Phase I	32	10
Phase II	117	37
Phase III	65	20
Phase IV	14	4
Unspecified	91	29
Randomization		
Nonrandomized	48	15
Randomized	114	36
Unspecified	157	49
Treatment end point		
Safety	24	8
Efficacy	68	21
Both	122	38
Unspecified	105	33

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Brachytherapy - (2016) in Article in Press

Table 1 (*continued*)

Characteristics	*N* (319)	%
Primary purpose		
Treatment	233	73
Supportive care	10	3
Unspecified	76	24
Age group		
Adult only	283	89
Pediatric allowed	36	11
Intervention status		
Interventional	288	90
Observational	31	10
Recruitment status		
Active	137	43
Completed	139	44
Not yet recruiting	15	5
Suspended or terminated	28	9

N = number; HDR = high dose rate; LDR = low dose rate.

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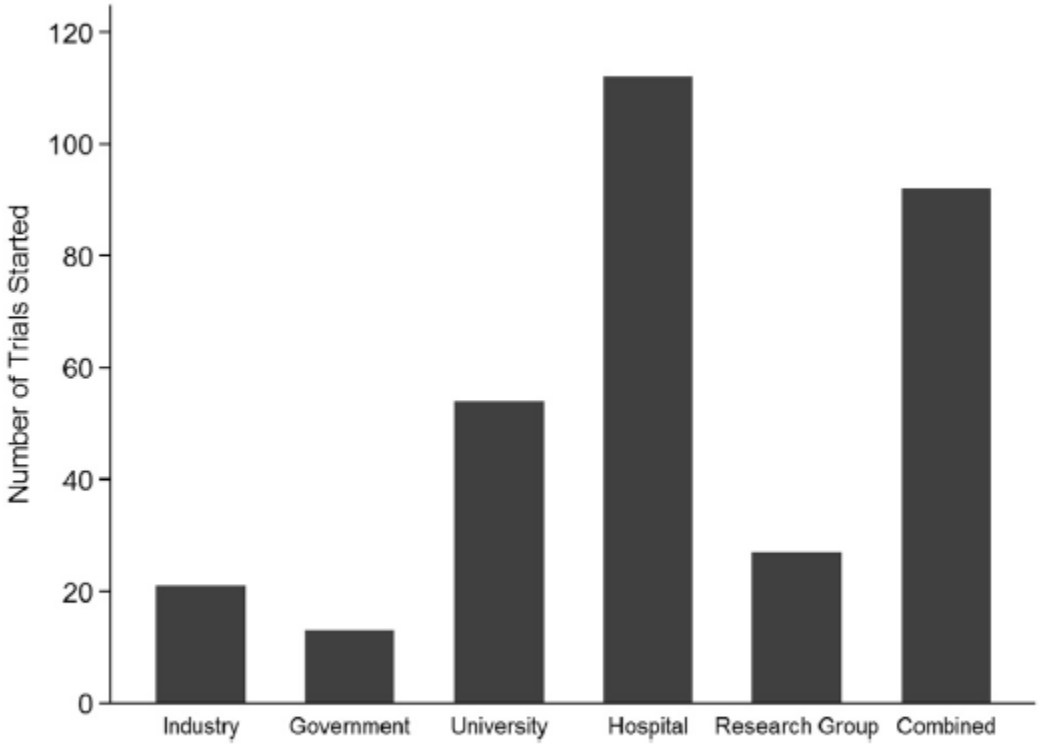

Fig. 1. Brachytherapy trials by funding source.

Portfolio of prospective clinical trials including brachytherapy: an analysis of the ClinicalTrials.gov database

Nicola Cihoric, Alexandros Tsikkinis, Cristina Gutierrez Miguelez, Vratislav Strnad et al.

Radiation Oncology 2016;11:48

Background: To evaluate the current status of prospective interventional clinical trials that includes brachytherapy (BT) procedures.

Methods: The records of 175,538 (100 %) clinical trials registered at ClinicalTrials.gov were downloaded on September 2014 and a database was established. Trials using BT as an intervention were identified for further analyses. The selected trials were manually categorized according to indication(s), BT source, applied dose rate, primary sponsor type, location, protocol initiator and funding source. We analyzed trials across 8 available trial protocol elements registered within the database.

Portfolio of prospective clinical trials including brachytherapy: an analysis of the ClinicalTrials.gov database

Nicola Cihoric, Alexandros Tsikkinis, Cristina Gutierrez Miguelez, Vratislav Strnad et al.

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Results: In total 245 clinical trials were identified, 147 with BT as primary investigated treatment modality and 98 that included BT as an optional treatment component or as part of the standard treatment. Academic centers were the most frequent protocol initiators in trials where BT was the primary investigational treatment modality ($p < 0.01$). High dose rate (HDR) BT was the most frequently investigated type of BT dose rate (46.3 %) followed by low dose rate (LDR) (42.0 %). Prostate was the most frequently investigated tumor entity in trials with BT as the primary treatment modality (40.1 %) followed by breast cancer (17.0 %). BT was rarely the primary investigated treatment modality for cervical cancer (6.8 %).

Conclusion: Most clinical trials using BT are predominantly in early phases, investigator-initiated and with low accrual numbers. Current investigational activities that include BT mainly focus on prostate and breast cancers. Important questions concerning the optimal usage of BT will not be answered in the near future.

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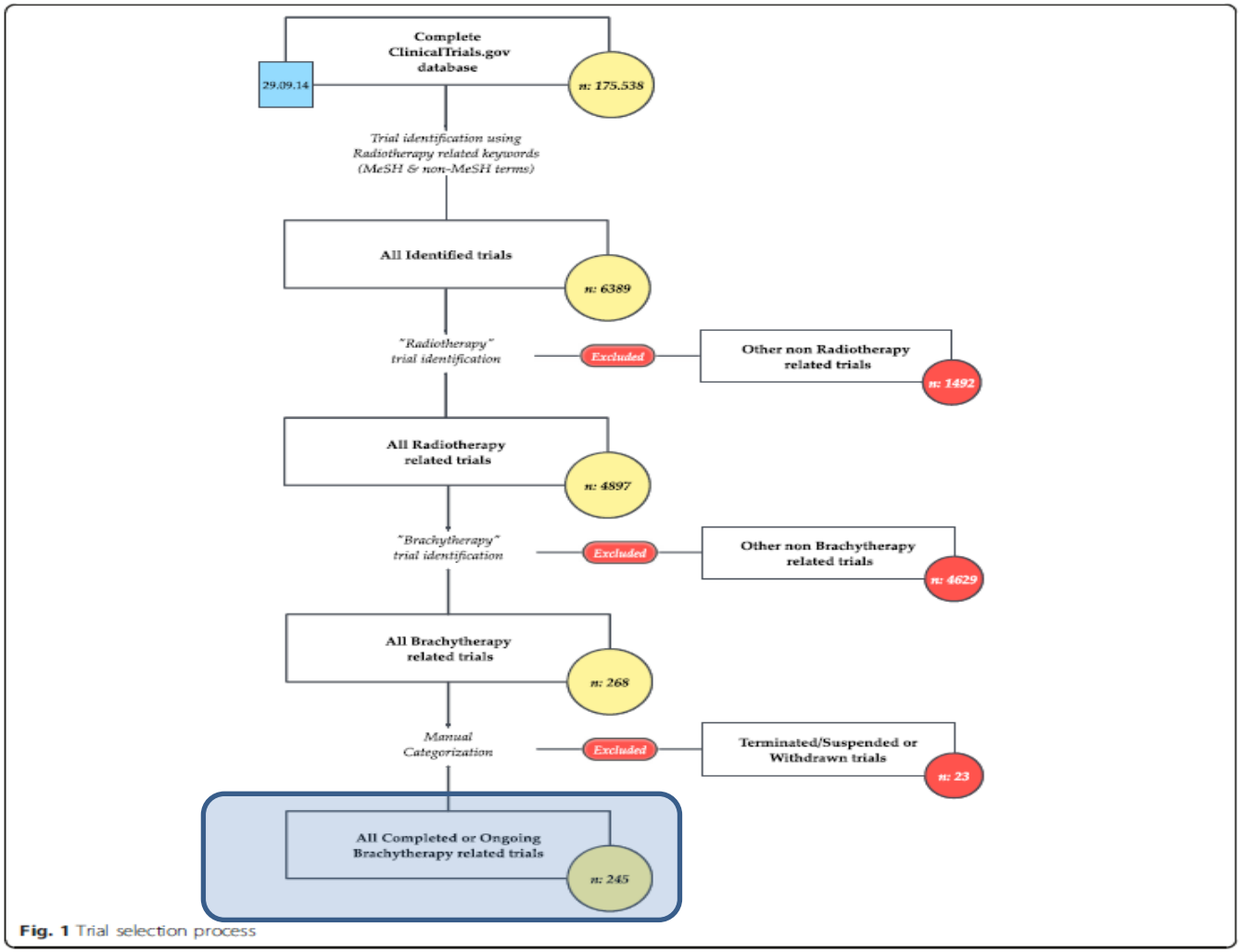
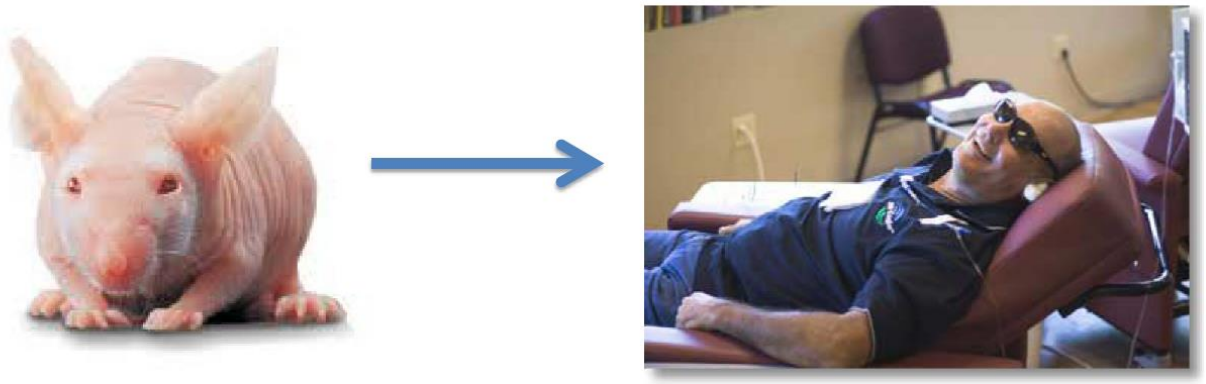


Fig. 1 Trial selection process

Trials

From mouse to man…



Clinical Research

Trials

Clinical Research

- Research with patient volunteers to help answer questions in the clinic
- Where we find out pros and cons of new treatments and/or compare different treatments
- e.g. should I have radical prostatectomy or radiation treatment for my prostate cancer?
- Clinical Trials

Trials -examples

Phases of Clinical Trials

- Phase I
  - Is this new treatment or drug safe?
  - How does the human body handle this treatment
  - Perhaps first time used in humans
  - e.g. investigation of new way of delivering radiation – Stereotactic Body Radiotherapy, SBRT

Trials -examples

Phases of Clinical Trials

- Phase II
  - Finds out how effective the new treatment is in a group of patients with cancer
  - More patients than in Phase I study
  - Find out more about side effects of treatment
  - e.g. HDR brachytherapy study

Trials -examples

Phases of Clinical Trials

- Phase III
  - The most difficult but most informative of all research studies
  - Compares two or more treatments
  - e.g. new treatment against a standard
  - Patients are Randomized to different arms of the trial
  - Large numbers are needed, long follow-up, expensive

Trials -examples

Phase III Clinical Trials

- Often ask difficult questions
- Sometimes fail to accrue sufficient number of patients
  - START: Phase III study comparing Active Surveillance with Immediate Treatment
  - SPIRIT: Phase III study comparing radical prostatectomy with brachytherapy

Trials -examples

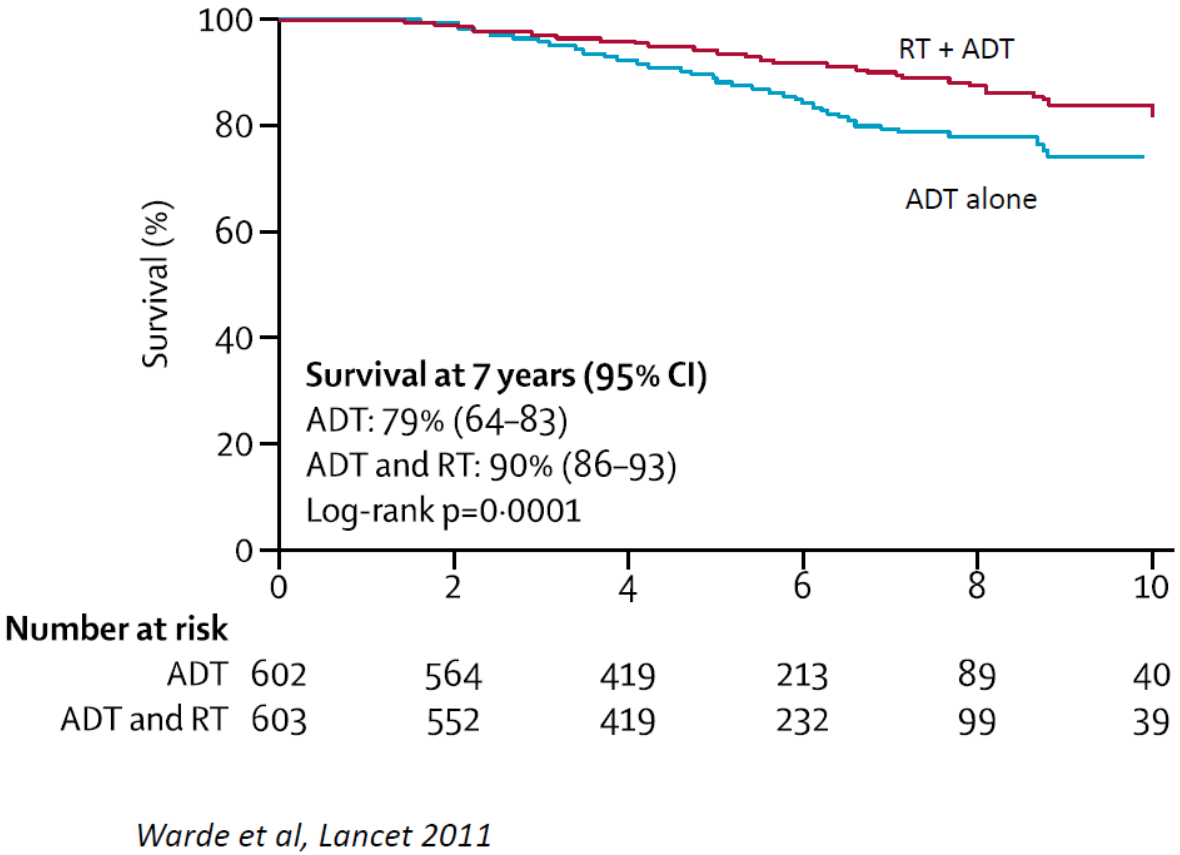
Combined androgen deprivation therapy and radiation therapy for locally advanced prostate cancer: a randomised, phase 3 trial

Padraig Warde, Malcolm Mason*, Keyue Ding, Peter Kirkbride, Michael Brundage, Richard Cowan, Mary Gospodarowicz, Karen Sanders, Edmund Kostashuk, Greg Swanson, Jim Barber, Andrea Hiltz, Mahesh K B Parmar, Jinka Sathya, John Anderson, Charles Hayter, John Hetherington, Matthew R Sydes†, Wendy Parulekar†, for the NCIC CTG PR.3/MRC UK PR07 investigators*

- For men with high risk prostate cancer, should we use radiation treatment in addition to hormone treatment?
- We didn't know the answer 10 years ago
- Large Phase 3 trial of NCIC CTG
- >1200 men randomized to have hormones + radiation or hormones alone

Warde et al, Lancet 2011

Trials -examples



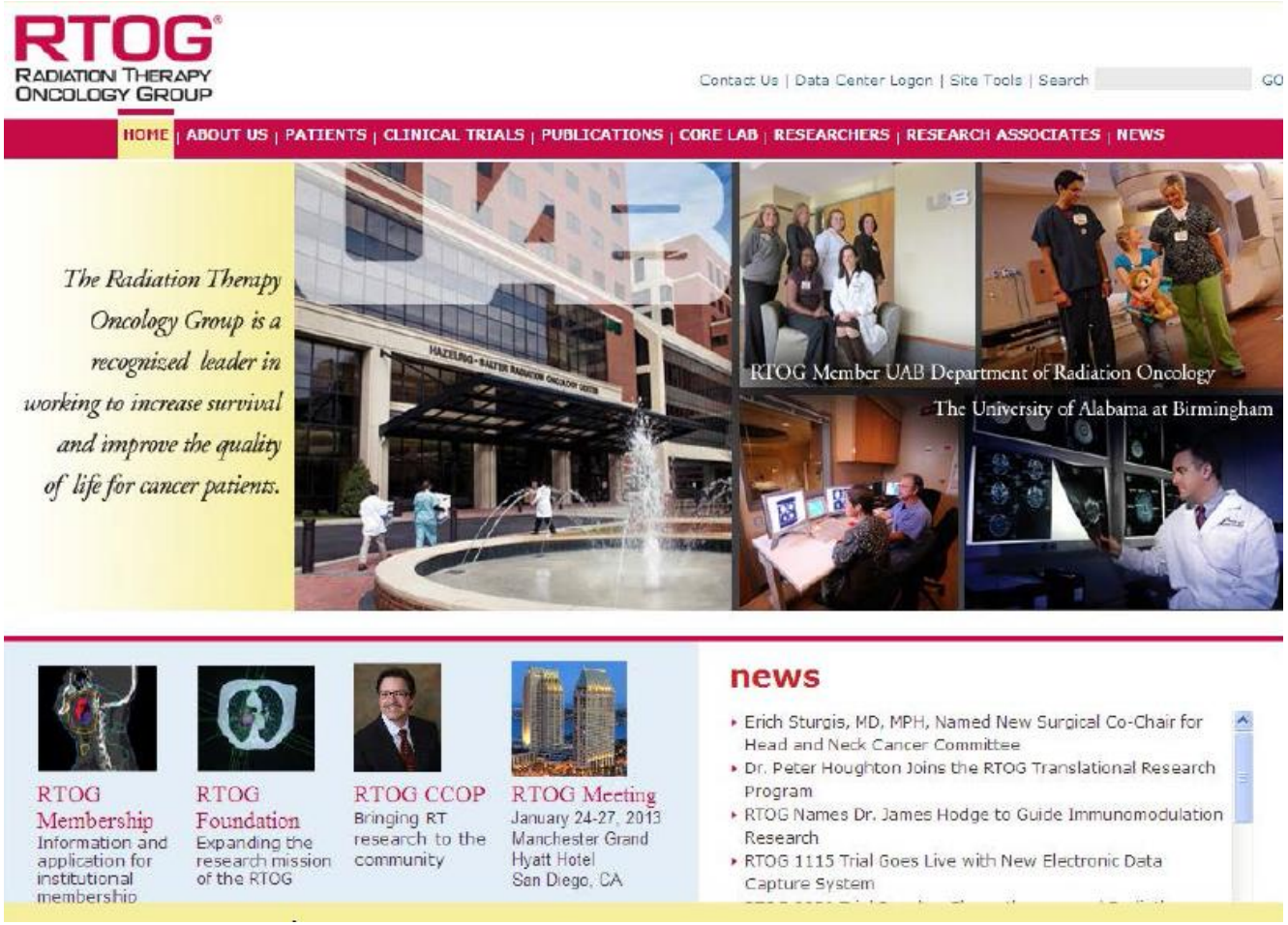
Warde et al, Lancet 2011

Trials -examples

Importance of the Study

- Demonstrate that even old school radiotherapy could improve survival of men with high risk prostate cancer
- Should not be managed with hormones alone

Trials -examples



Trials -examples

RTOG®
RADIATION THERAPY ONCOLOGY GROUP

- Clinical Trials Exploring New Directions in Radiation Therapy
- Quality of Life Research
- Translational Research

ACR®
AMERICAN COLLEGE OF RADIOLOGY

What is the RTOG?

RTOG was established in 1967 as a cooperative effort of physicians, physicists, biologists, and biostatisticians to pursue clinical investigations designed to increase survival and improve the quality of life of patients with cancer. Over 300 academic and community-based facilities in the United States, Canada and internationally participate in RTOG clinical trials, including nearly 90 percent of all NCI-designated comprehensive and clinical cancer centers. Since its inception, RTOG has opened more than 460 protocols, enrolled over 75,000 patients to its studies, and published more than 700 papers reporting the results of its findings.

RTOG maintains a roster of 40 active studies devoted to the group's primary disease sites: central nervous system, head & neck, lung, gastrointestinal (esophagus, stomach, pancreas, anal canal, and rectum), genitourinary (bladder and prostate), breast, and cervix.

www.rtog.org

RTOG's Mission

- Improve the survival outcome and quality of life of adults with cancer through the conduct of high-quality clinical trials.
- Evaluate new forms of radiotherapy delivery, including stereotactic radiotherapy, brachytherapy, 3-dimensional conformal radiotherapy (3-DCRT), and intensity-modulated radiotherapy (IMRT) in the context of clinical research.
- Test new systemic therapies in conjunction with radiotherapy, including chemotherapeutic drugs, hormonal strategies, biologic agents, and new classes of cytostatic, cytotoxic, and targeted therapies.
- Employ translational research strategies to identify patient subgroups at risk for failure with existing treatments and identify new approaches for these patients.

Trials -examples

Open RTOG Prostate Studies

- Low Risk
  - RTOG 0938: hypofractionated RT
- Intermediate Risk Disease
  - RTOG 0815: role of ADT with high dose RT
- High Risk Disease
  - RTOG 0924: Role of pelvic RT
  - RTOG 1115: Role of TAK-700 in addition to RT/ADT
- Recurrent Disease
  - 0526: Role of brachytherapy salvage following EBRT
  - 0534: Radiotherapy +/- ADT following Prostatectomy
  - 0622: Radiotherapy +/- Sumarium-153 following prostatectomy

Radiation Oncology/Prostate/RTOG Prostate

https://en.wikibooks.org/wiki/Radiation_Oncology/Prostate/RTOG_Prostate

PROSTATE RTOG OPEN TRIALS

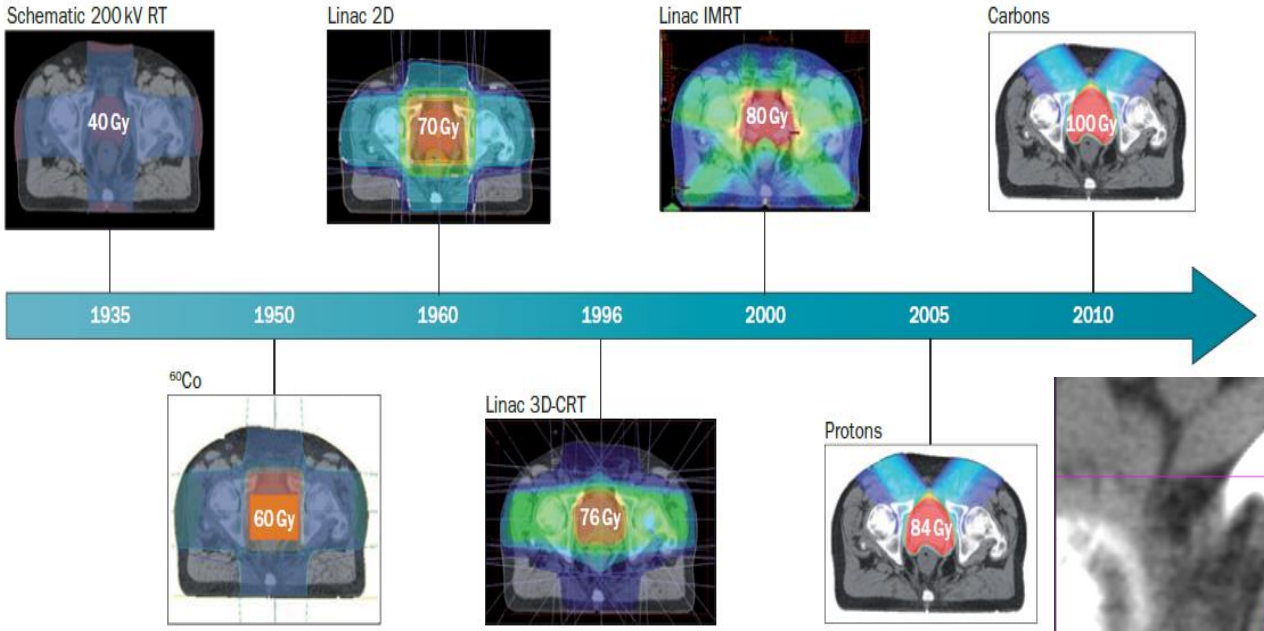
Number	*Title*
09-24	A Phase III Prospective Randomized Trial of Androgen Deprivation Therapy and High Dose Radiotherapy With or Without Whole-Pelvic Radiotherapy in Unfavorable Intermediate or Favorable High Risk Prostate Cancer
08-15	A Phase III Prospective Randomized Trial of Dose-Escalated Radiotherapy With or Without Short-Term Androgen Deprivation Therapy for Patients With Intermediate-Risk Prostate Cancer
06-22	A Phase II Trial Of Samarium 153 Followed By Salvage Prostatic Fossa 3D-CRT Or IMRT Irradiation In High-Risk, Clinically Non-Metastatic Prostate Cancer After Radical Prostatectomy
06-21	Adjuvant 3DCRT/IMRT in Combination with Androgen Suppression and Docetaxel for High Risk Prostate Cancer Patients Post-Prostatectomy: A Phase II Trial
06-12	Investigating Markers of Radiation Outcome in Patients With Intermediate-Risk Prostate Cancer Using DNA Microarray Analysis: An RTOG Pilot Study
05-34	Phase III trial of short term androgen deprivation with pelvic lymph node or prostate bed only radiotherapy (SPPORT)in prostate cancer patients with a rising PSA after radical prostatectomy
05-26	A Prospective Phase II Trial Of Transperineal Ultrasound-Guided Brachytherapy For Locally Recurrent Prostate Adenocarcinoma Following External Beam Radiotherapy
02-32	A Phase III Study Comparing Combined External Beam Radiation and Transperineal Interstitial Permanent Brachytherapy With Brachytherapy Alone for Selected Patients with Intermediate Risk Prostatic Carcinoma
02-15	Treatment of Erectile Dysfunction In Patients Treated With Neoadjuvant Androgen Suppression and Radiotherapy for Prostate Cancer: Impact on Patient and Partner Quality of Life
01-26	A Phase III Randomized Study of High Dose 3D-CRT/IMRT vs. Standard Dose 3D-CRT/IMRT in Patients Treated for Localized Prostate Cancer

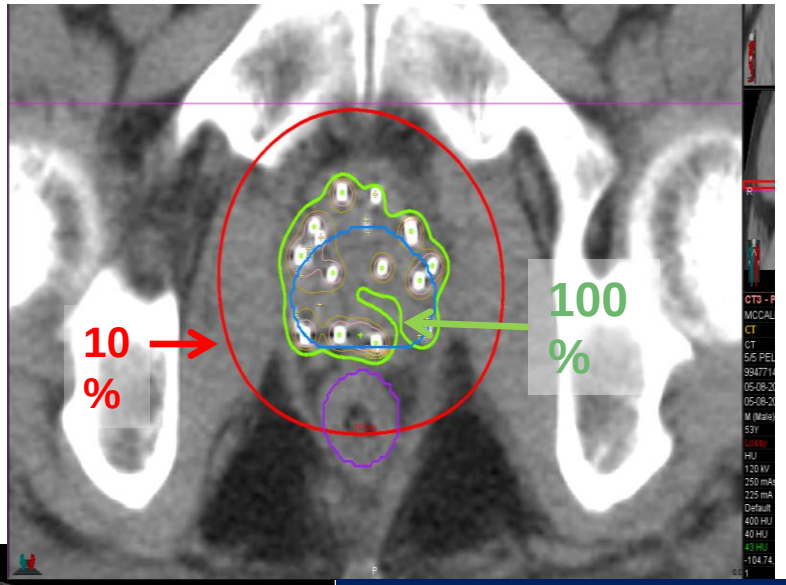
Trials -examples

Summing it all up

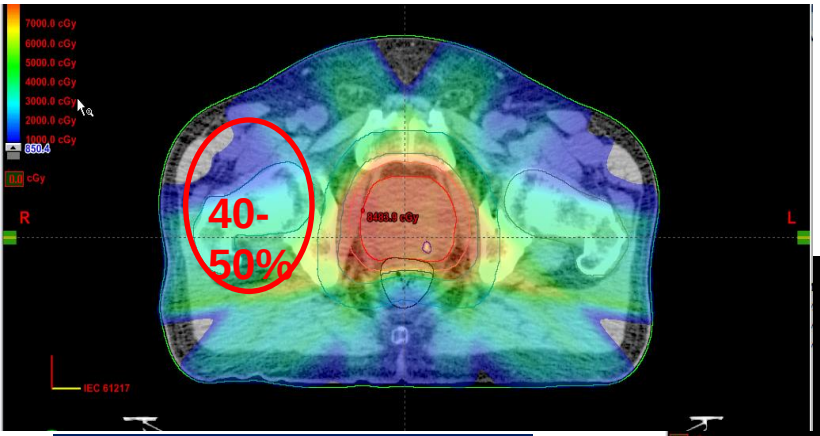
- Radiotherapy has a major role in management of all stages of prostate cancer
  - External Beam
  - Brachytherapy
  - Systemic radiotherapy
- Rapidly evolving technologies need to be evaluated in Clinical Trials
- Many questions, fewer answers
- Support Clinical Trials!

Prostatic Radiotherapy

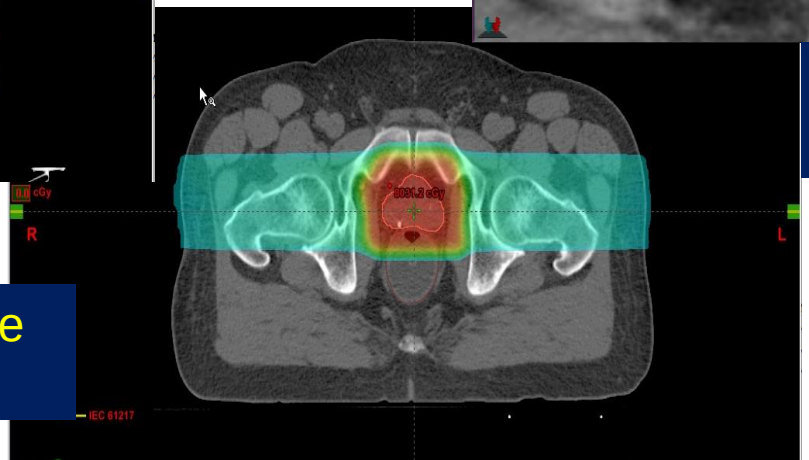




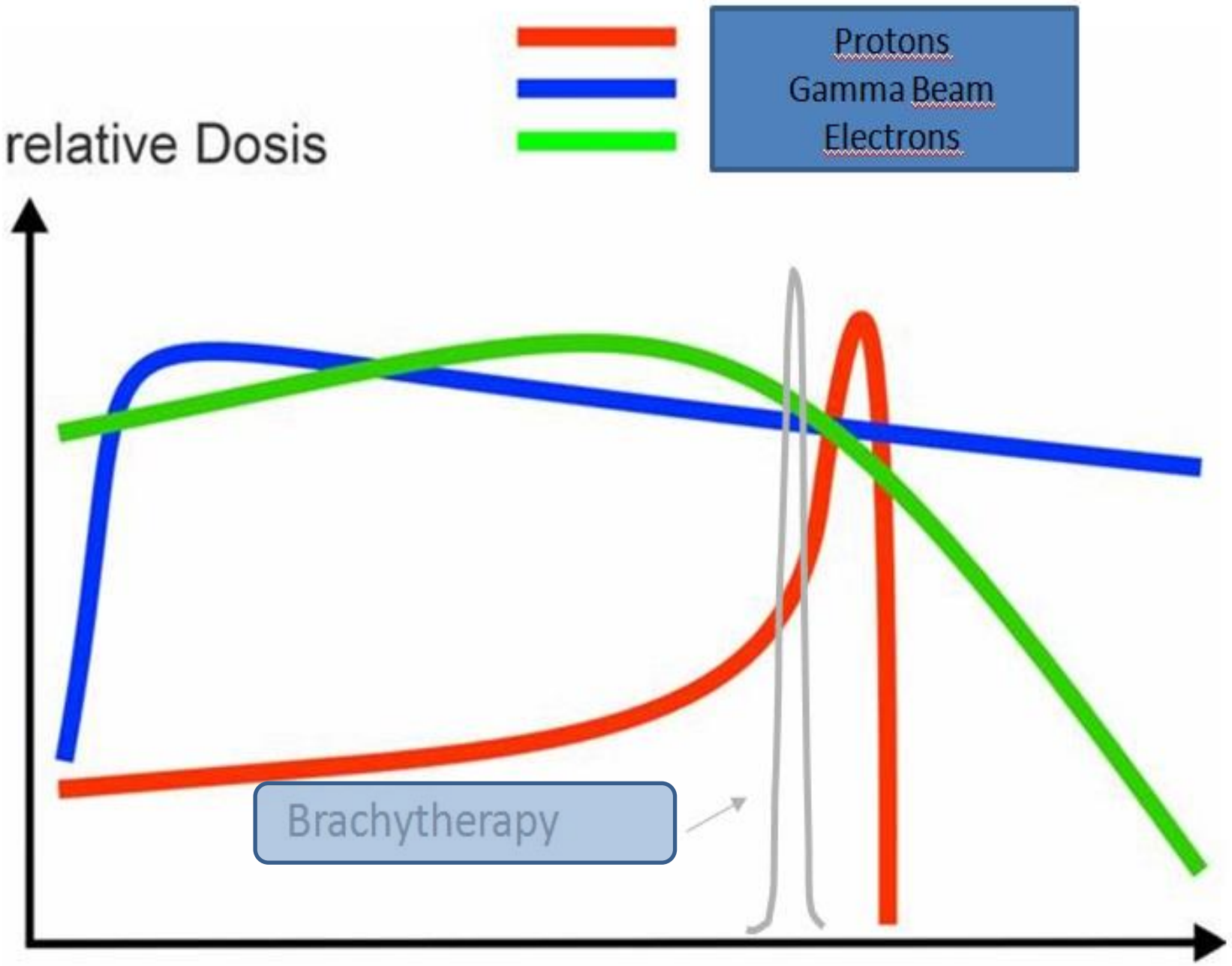
10% Isodose LDR Brachy



Target Volume IMRT



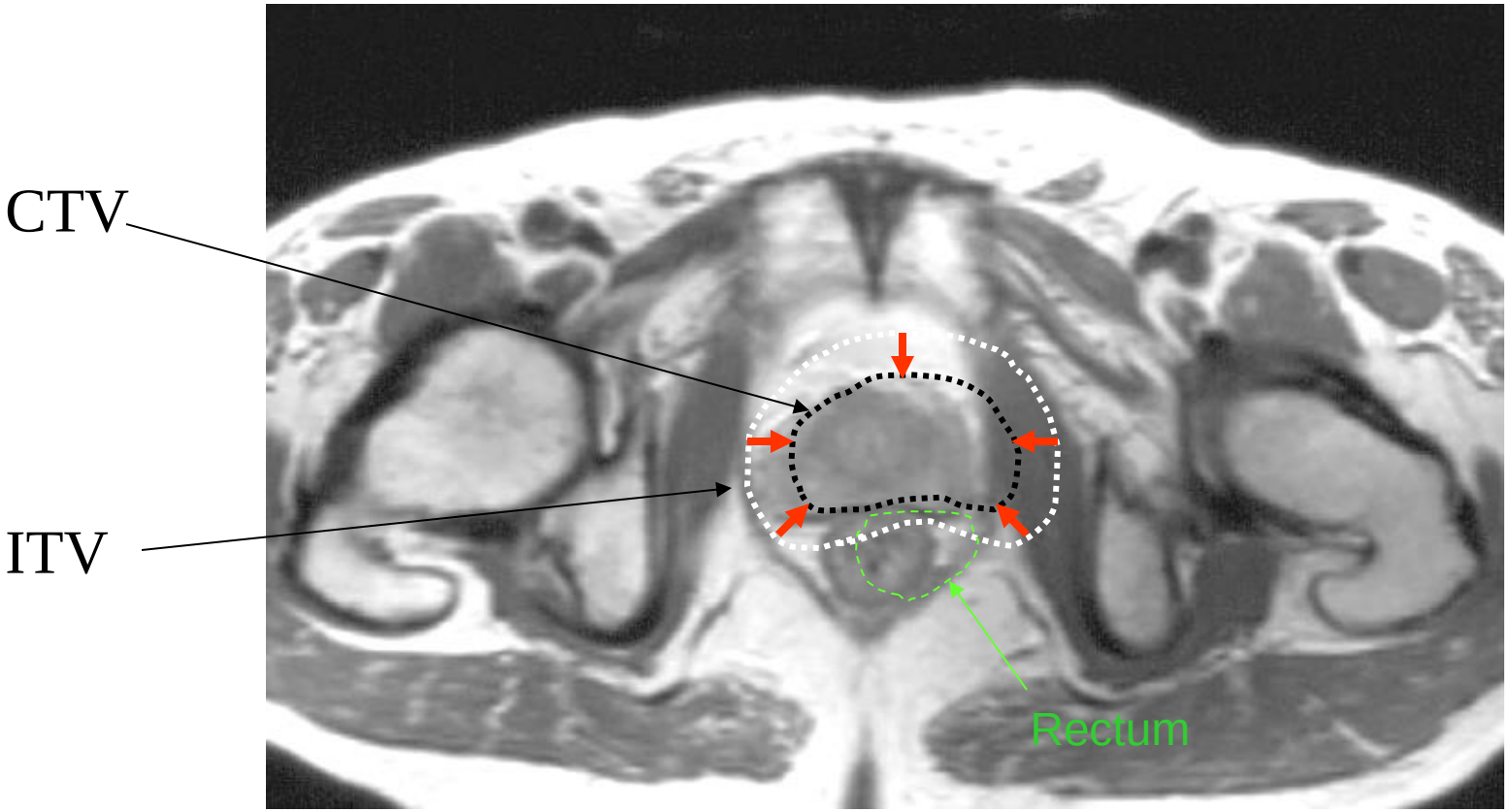
Target Volume Protons


Protons
Gamma Beam
Electrons
relative Dosis
Brachytherapy

Potential of Brachytherapy:
Moving target is not a problem in BT
Moving target remains a problem in EBRT

Interstitial Brachytherapy for Prostate: CTV = PTV

No margin necessary . Much smaller PTV



Why prostate brachytherapy?

- **No organ motion**
- **No set-up errors**
- **No CBCT or Tomo target identification uncertainties**
- **No large low-dose normal tissues radiation volumes**
- **No organ position tracking errors**
- **No seeds migration, clumping, dose uncertainties over time, etc.**
- **No temporary prostate edema**
- **Accurate dosimetry and dose delivery**
- **Radiobiological advantage**
- **Cost, reimbursement**

Courtesy: Michel Ghilezan, Michigan Healthcare Professionals, Farmongton Hills, MI

Brachytherapy – why?

- Time (physician/patient)
- Cost (patient/government/hospital)
- Disease outcomes
- Quality of Life
- Patient’s satisfaction

easily money can decide on the treatment of patients and not the curability or quality of life after treatment.


Thank you