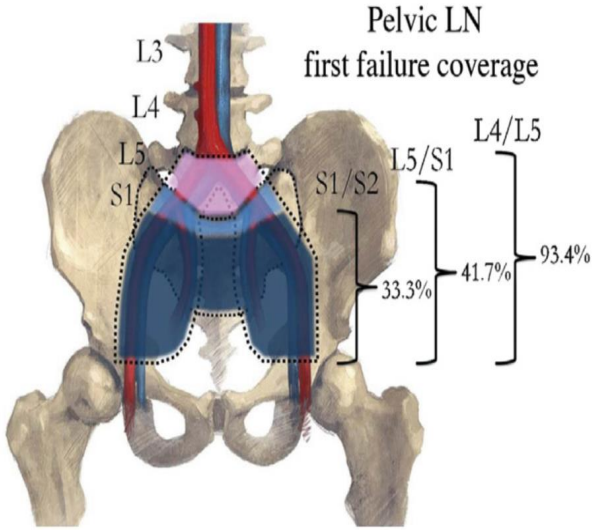
Kiedy napromieniać węzły chłonne w raku gruczołu krokowego? – wyniki badań klinicznych i rekomendacje



Jacek Fijuth

Katedra Onkologii U.M.

WWCOiT, Regionalny Ośrodek Onkologii i Hematologii

Łódź

3R, Warszawa, 16-17.11.2018

Sytuacje kliniczne

- cN0
- cN1
- pN0
- pN1

Sytuacje kliniczne

- cN0
- cN1
- pN0
- pN1

Decyzja o elektywnym napromienianiu regionalnych w/ch w raku stercza powinna być podjęta na podstawie obiektywnie określonego ryzyka ich zajęcia!

Niestety brak wiarygodnych narzędzi do oceny takiego ryzyka!

cN0

- niska czułość obrazowania układu chłonnego miednicy
  - RM i TK - 40% (EUA), [*przewaga DW-RM*]
  - PET-CT cholina 62% (Von Eyben, w innych badaniach niższa)
  - PET-CT PSMA 53% (Obek)
- brak przewagi RM nad TK (NCCN 4.2018)
- trudność określenia punktu odcięcia dla przerzutowych ww. chłonnych
  - >8mm-miednica
  - >10mm-poza miednicą
- wiarygodna ocena węzłów chłonnych tylko przy diagnostyce inwazyjnej?

Nucl Med Commun. 2014 Mar;35(3):221-30. doi: 10.1097/MNM.0000000000000040.

Meta-analysis of (11)C-choline and (18)F-choline PET/CT for management of patients with prostate cancer.

von Eyben FE[1], Kairemo K.

Eur J Nucl Med Mol Imaging. 2017 Oct;44(11):1806-1812. doi: 10.1007/s00259-017-3752-y. Epub 2017 Jun 18.

The accuracy of ^{68}Ga-PSMA PET/CT in primary lymph node staging in high-risk prostate cancer.

Öbek C[1], Doğanca T[2], Demirci E[3], Ocak M[4], Kural AR[5], Yıldırım A[6], Yücetaş U[7], Demirdağ Ç[8], Erdoğan SM[9], Kabasakal L[10]; Members of Urooncology Association, Turkey.

Nomogramy wykorzystywane do oceny ryzyka zajęcia węzłów chłonnych

Role of NOMOGRAMS.

- **Partin nomograms :** pathologic stage (organ confined, ECE, seminal vesicle invasion, or LN involvement) based on T stage, GS, and pretreatment PSA
- **Roach formulas:** estimate pathologic stage based on **original Partin data**

1. **ECE = 3/2 × PSA + 10 × (GS-3)**
2. **Seminal vesicle involvement = PSA + 10 × (GS-6)**
3. **LN involvement = 2/3 × PSA + 10 × (GS-6)**

- **Kattan nomograms** are computerized and predict primarily PSA recurrence, but some also predict PFS as well as prostate cancer specific mortality after RP, 3DCRT, or brachytherapy.
- **Brignanti nomograms:** (using extended LN dissection) show higher rates and support importance of obtaining larger # of LN (e.g., 28 to detect 90%) to improve chance of detecting involvement

Węzły chłonne

Int J Radiat Oncol Biol Phys. 2009 May 1;74(1):104-9. doi: 10.1016/j.ijrobp.2008.07.053. Epub 2009 Mar 13.

Predicting the risk of pelvic node involvement among men with prostate cancer in the contemporary era.

Nguyen PL[1], Chen MH, Hoffman KE, Katz MS, D'Amico AV.

„Applied to contemporary patients with mainly T1c/T2 disease, ***the Roach formula appears to overestimate*** *pelvic lymph node risk."*

W wielu badaniach klinicznych, np. RTOG 94-13 wzór Roach'a był zasadniczym narzędziem stosowanym do oceny ryzyka zajęcia w/ch, jako podstawy decyzji o podjęciu WPRT

Historia….

Czy profilaktyczna RT w/ch jest uzasadniona (rok 2003)?

Tak, w przypadku gdy ryzyko N(+) ≥15%

Roach M III, DeSilvio M, Lawton C, et al: Phase III trial comparing whole-pelvic versus prostate only radiotherapy and neoadjuvant versus adjuvant combined androgen suppression: **Radiation Therapy Oncology Group 9413**. J Clin Oncol 21:1904-1911, 2003

Konieczne badania z uwzględnieniem czynników prognostycznych i stosowania ADT

Histopatologiczna weryfikacja wzoru Roach'a

Ryzyko N(+) wg wzoru Roach'a (%)	Potwierdzone N(+) (%)	Liczba chorych	Liczba chorych z N(+)
80-89.9	14	7	1
70-79.9	0	6	0
60-69.9	18	39	7
50-59.9	23	83	19
40-49.9	17	207	35
30-39.9	14	601	84
20-29.9	7	927	68
15-19.9	3	1,154	37
10-14.9	2	2,956	45
f5-9.9	0.3	742	2
f0-4.9	0.4	2,713	10
> 15	8	3,024	251
< 15	1	6,411	57

Dane z opracowania SEER (Surveillance Epidemiology and End Results) z 2004 roku dla chorych ze stężeniem PSA <100 ng/mL

Czy profilaktyczna RT w/ch jest uzasadniona (2007)?

Nie, przy dłuższej obserwacji (jednak WPRT + HT wciąż standardem)

Lawton CA, DeSilvio M, Roach M III, et al: An update of the phase III trial comparing whole pelvic to prostate only radiotherapy and neoadjuvant to adjuvant total androgen suppression: Updated analysis of RTOG 94-13, with emphasis on unexpected hormone/radiation interactions. Int J Radiat Oncol Biol Phys 69:646-655, 2007

Nie, w zakresie przeżyć bez progresji biochemicznej, w badaniu GETUG-01, materiał 444 chorych

Pommier P, Chabaud S, Lagrange JL, et al: Is there a role for pelvic irradiation in localized prostate adenocarcinoma? Preliminary results of GETUG-01. J Clin Oncol 25:5366-5373, 2007

Konieczne badania z uwzględnieniem czynników prognostycznych i stosowania ADT

cN0

GETUG 01 RTOG 7706	Pommier JCO 2007	WPRT nie poprawia PFS ale nie zwiększa również toksyczności Korzyść jedynie w grupie ryzyka N+ <15% wg Roach'a **Głównie chorzy z grup LR i IR**	Bez poprawy OS, PFS , EFS (*event free survival*)
RTOG 9413	Lawton IJROBP 2007 Roach ASTRO 2013	**4 ramiona WPRT/Stercz+PN/neoADT/adjADT.** *Bez różnic WPRT vs Stercz+PN*. Bez różnic neoADT/adjADT. **Zysk neoADT+WPRT.** **PSA<100ng/ml, ok 25% pacjentów w każdym z ramion z >35% ryzykiem LN+**	↑PFS i BFS
RTOG 0924		Grupy UIR, HR(korzystna). **Wysokodawkowa** RT + ADT +/-WPRT.	*W toku*

Int J Radiat Oncol Biol Phys. 2007 Nov 1;69(3):646-55. Epub 2007 May 24.

An update of the phase III trial comparing whole pelvic to prostate only radiotherapy and neoadjuvant to adjuvant total androgen suppression: updated analysis of RTOG 94-13, with emphasis on unexpected hormone/radiation interactions.

Lawton CA[1], DeSilvio M, Roach M 3rd, Uhl V, Kirsch R, Seider M, Rotman M, Jones C, Asbell S, Valicenti R, Hahn S, Thomas CR Jr.

J Clin Oncol. 2007 Dec 1;25(34):5366-73.

Is there a role for pelvic irradiation in localized prostate adenocarcinoma? Preliminary results of GETUG-01.

Pommier P[1], Chabaud S, Lagrange JL, Richaud P, Lesaunier F, Le Prise E, Wagner JP, Hay MH, Beckendorf V, Suchaud JP, Pabot du Chatelard PM, Bernier V, Voirin N, Perol D, Carrie C.

Wątpliwości dotyczące badań RTOG 94-13 i GETUG 01

- Niska dawka RT stercz + PN
  - GETUG 01 66-70Gy/2,0Gy
  - RTOG 94-13 70,2/1,8Gy

→ Niska skuteczność miejscowa, wyleczenie miejscowe warunkiem oceny pierwotnego ryzyka cN+

- Stare techniki RT
  - GETUG 01: WPRT konwencjonalna technika 4-polowa, stercz + PN planowanie 3D
  - RTOG 94-13: WPRT konwencjonalna technika 4-polowa, stercz bez planowania 3D

Wątpliwości dotyczące badań RTOG 94-13 i GETUG 01

- Obszar napromienia - granica górna WPRT
  - RTOG 94-13 **L5/S1**
  - GETUG 01 **S1/S2**

- ADT nie u wszystkich chorych z grupy wysokiego ryzyka

- GETUG 01 duży odsetek chorych z niskim ryzykiem zajęcia w/ch (<15% wg. wzoru Roacha)

Author	Institution		Key Findings
Seaward[178,179]	UCSF	Retrospective single-institutional analysis of patients undergoing prostate-only or WPRT with and without hormonal therapy	WPRT defined at superior border L5-S1. Noted WPRT associated with improved PSA control rate. Greatest benefit seen for those with risk between 15% and 30%.
Pan[180]	University of Michigan	Compared men treated with definitive 3D-CRT (N = 1832) divided into three categories based on the estimated risk (Partin Table) of LN involvement: 0%-5%, >5%-15%, and >15%.	Significant benefit for WPRT in men with risk of LN involvement of 5%-15% with an improved 2-year PSA control rate, 90.1% vs. 80.6% (P = 0.02).
Roach[140]	RTOG	Phase randomized trial III (N ~1200) comparing sequence of hormonal therapy and role of WPRT vs. prostate-only radiotherapy. Primary endpoint: PFS (including PSA, clinical failure, death from any cause).	WPRT associated with improvement in PFS when preceded by CAB but not when administered before CAB
Jacob[181]	Fox Chase Cancer Center	Retrospective analysis of patients with risk +LN >15% treated with WPRT vs. partial pelvic radiotherapy, or prostate-only fields (N = 420). Concluded radiation dose was the major determinant of PSA control in patients with a LN risk >15%, with no benefit to pelvic radiotherapy or hormonal therapy.	None of the patients received WPRT (defined as superior border L5-S1) as defined by RTOG 9413. All patients' pelvic fields would have been included in prostate-only arm of RTOG 9413.
Spiotto[145]	Stanford	Retrospective analysis of postoperative patients undergoing prostate-only or WPRT with and without hormonal therapy.	Use of WPRT associated with an improvement in PSA control rate in the setting of salvage radiotherapy, with greatest benefit seen in patients with adverse features
Pommier[184]	Multicenter French Trial	444 patients with T_{1c}-$T_3N_0M_0$ randomized to 66-70 Gy to prostate +/- 46 Gy to pelvis with the superior border set to S1/S2. Radiotherapy preceded by 4-8 months of CAB in some "high-risk" patients (>T_3, GS >7, or PSA >3 × normal). Most patients had LN risk <15% (55%) using Roach formula.	None of the patients received WPRT (defined as top L5-S1); most were low-risk for LN involvement (median PSA 12, ~25% T_3, and ~10% GS 8-10), and some did not receive CAB.

Wyniki badań rozbieżne, bez wpływu na OS, wpływ na bCR, PFS, znaczna heterogenność grup, różna sekwencja stosowania ADT

Da Pozzo[143]	Italy	Retrospective study of 250 consecutive patients with positive lymph nodes. Compared outcomes in 129 men treated with WPRT (51.6%) and ADT and 121 patients (48.4%) received ADT alone.	Multivariable analysis use of WPRT and the number of positive LNs were major predictors of PSA control ($P = 0.002$ and $P = 0.003$) and cause-specific survival ($P = 0.009$ and $P = 0.01$).
Aizer[144]	Yale	Retrospective review of 277 consecutive patients with estimated risk of LN involvement >15%.	After adjusting for other factors, WPRT group had improved 4-year biochemical control rate (69.4% vs. 86.3%).
Milecki[536]	Greater Poland Cancer Center	Retrospective analysis including men with high-risk disease ($N = 162$) with and without WPRT.	The 5-year actuarial CSSs were A = 90% and B = 79% ($P = 0.01$) and PSA control rates 52% versus 40% ($P = 0.07$), respectively.

Wyniki badań rozbieżne, bez wpływu na OS, wpływ na bCR

(jedynie w pracy prof. Mileckiego pozytywny wpływ WPRT na 5-letnie, aktualizowane CSS)

Whole Pelvis Versus Prostate-Only Radiotherapy With or Without Short-Course Androgen Deprivation Therapy and Mortality Risk

Lior Z. Braunstein, Ming-Hui Chen, Daniel E. Dosoretz, Sharon A. Salenius, Michael J. Katin, Akash Nanda, Anthony V. D'Amico

Conclusion

Treatment with WPRT or short-course ADT is associated with a decreased risk of ACM, although a combination of the two does not yield greater benefit. This observation suggests a shared mechanism for this risk reduction, which we hypothesize to be via the treatment of micrometastatic disease within the pelvic lymph nodes.

Int J Radiat Oncol Biol Phys. 2011 Dec 1;81(5):e721-6. doi: 10.1016/j.ijrobp.2010.12.003. Epub 2011 Jan 27.

Effect of whole pelvic radiotherapy for patients with locally advanced prostate cancer treated with radiotherapy and long-term androgen deprivation therapy.

Mantini G[1], Tagliaferri L, Mattiucci GC, Balducci M, Frascino V, Dinapoli N, Di Gesù C, Ippolito E, Morganti AG, Cellini N.

CONCLUSIONS: Our analysis has supported the use of WPRT in association with long-term ADT for patients with high-risk nodal involvement (>30%), although a definitive recommendation should be confirmed by a randomized trial.

Int J Radiat Oncol Biol Phys. 2015 Dec 1;93(5):1052-63. doi: 10.1016/j.ijrobp.2015.09.006. Epub 2015 Sep 18.

Survival Outcomes of Whole-Pelvic Versus Prostate-Only Radiation Therapy for High-Risk Prostate Cancer Patients With Use of the National Cancer Data Base.

Amini A[1], Jones BL[1], Yeh N[1], Rusthoven CG[1], Armstrong H[1], Kavanagh BD[2].

CONCLUSION: In the largest reported analysis of WPRT for patients with high-risk prostate cancer treated in the dose-escalated era, the addition of WPRT demonstrated no survival advantage compared with PO-RT.

Wyniki badań rozbieżne, bez wpływu na OS, wpływ na bCR, PFS, znaczna heterogenność grup, różna sekwencja i długość stosowania ADT

RTOG 0924 – „słabe punkty”?

STRATIFY		RANDOMIZE	
	Risk Group 1. GS 7-10 + T1c-T2b + PSA < 50 ng/ml 2. GS 6 + T2c-T4 or > 50% biopsies + PSA < 50 ng/ml 3. GS 6 + T1c-T2b + PSA > 20 ng/ml		**Arm 1:** Neoadjuvant androgen deprivation therapy + prostate & seminal vesicle RT + boost to prostate & proximal seminal vesicles
	Type of RT Boost 1. IMRT 2. Brachytherapy (LDR using PPI or HDR)		**Arm 2:** Neoadjuvant Androgen Deprivation Therapy + whole-pelvic RT + boost to prostate & proximal seminal vesicles
	Duration of Androgen Deprivation Therapy 1. Short Term (6 months) 2. Long Term (32 months)*		

L. chorych planowanych do włączenia → 2580

45Gy

Dyskusyjną (i nierozwiązaną) kwestią pozostaje dawka WPRT – czy wskazana eskalacja?

RTOG 0924 – znaczna heterogenność – końcowa ocena badania w 2031 r.

DISEASE CHARACTERISTICS:

- Pathologically (histologically or cytologically) proven diagnosis of prostatic adenocarcinoma within 180 days of registration at moderate- to high-risk for recurrence as determined by one of the following combinations:
  - Gleason score 7-10 + T1c-T2b (palpation) + prostate-specific antigen (PSA) < 50 ng/mL (includes intermediate- and high-risk patients)
  - Gleason score 6 + T2c-T4 (palpation) + PSA < 50 ng/mL OR
  - Gleason score 6 + >= 50% (positive) biopsies + PSA < 50 ng/ml
  - Gleason score 6 + T1c-T2b (palpation) + PSA > 20 ng/mL Patients previously diagnosed with low risk prostate cancer undergoing active surveillance who are re-biopsied and found to have unfavorable intermediate risk disease or favorable high risk disease according to the protocol criteria are eligible for enrollment within 180 days of the repeat biopsy procedure.
- History and/or physical examination (to include at a minimum digital rectal examination of the prostate and examination of the skeletal system and abdomen) within 90 days prior to registration
- Clinically negative lymph nodes as established by imaging (pelvic and/or abdominal CT or MR), (but not by nodal sampling, or dissection) within 90 days prior to registration
  - Patients with lymph nodes equivocal or questionable by imaging are eligible if the nodes are ≤ 1.5 cm
  - Patients status post a negative lymph node dissection are not eligible

https://clinicaltrials.gov/ct2/show/record/NCT01368588

Int. J. Radiation Oncology Biol. Phys., Vol. 81, No. 5, pp. e721–e726, 2011
Copyright © 2011 Elsevier Inc.
Printed in the USA. All rights reserved
0360-3016/$ - see front matter
doi:10.1016/j.ijrobp.2010.12.003

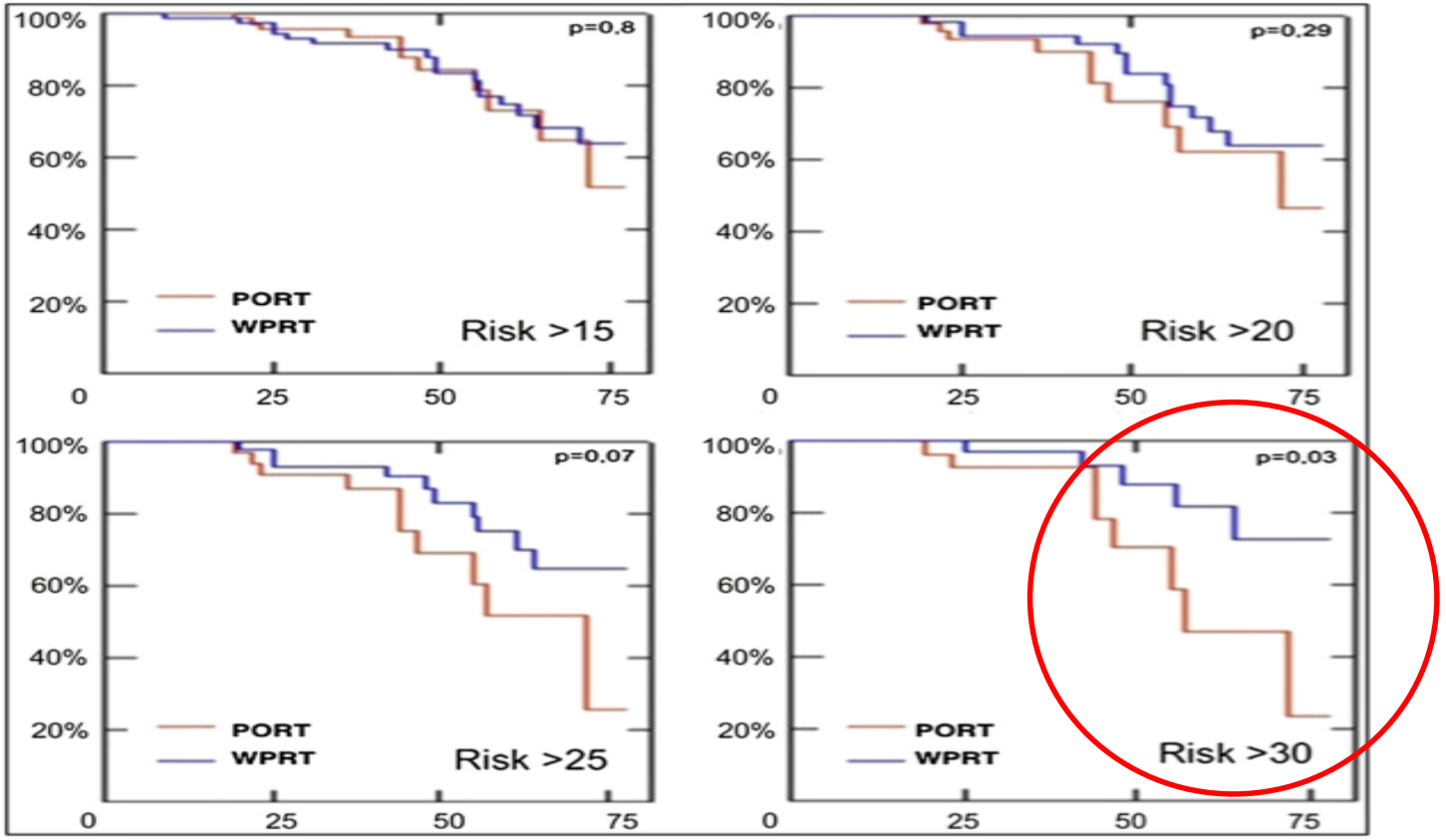
CLINICAL INVESTIGATION — Prostate

EFFECT OF WHOLE PELVIC RADIOTHERAPY FOR PATIENTS WITH LOCALLY ADVANCED PROSTATE CANCER TREATED WITH RADIOTHERAPY AND LONG-TERM ANDROGEN DEPRIVATION THERAPY

Giovanna Mantini, M.D.,* Luca Tagliaferri, M.D.,* Gian Carlo Mattiucci, M.D.,* Mario Balducci, M.D.,* Vincenzo Frascino, M.D.,* Nicola Dinapoli, M.D.,* Cinzia Di Gesù, M.D.,† Edy Ippolito, M.D.,† Alessio G. Morganti, M.D.,† and Numa Cellini, M.D.*

Wzrastające ryzyko cN(+) – wyraźniejszy efekt WPRT

Ocena ryzyka N(+)???



National Comprehensive Cancer Network®

NCCN Guidelines Version 4.2018
Prostate Cancer

Kiedy napromieniać w cN0?

- Low Risk: Prophylactic lymph node radiation should NOT be performed routinely.
- Favorable Intermediate Risk: Prophylactic lymph node radiation is not performed routinely, and ADT or antiandrogen therapy is not used routinely. Prophylactic lymph node radiation and/or ADT use is reasonable if additional risk assessments suggest aggressive tumor behavior.

- Unfavorable Intermediate Risk: Prophylactic nodal radiation can be considered if additional risk assessments suggest aggressive tumor behavior.
- High Risk: Prophylactic nodal radiation can be considered.

- Very High Risk: Prophylactic nodal radiation **should be** considered.

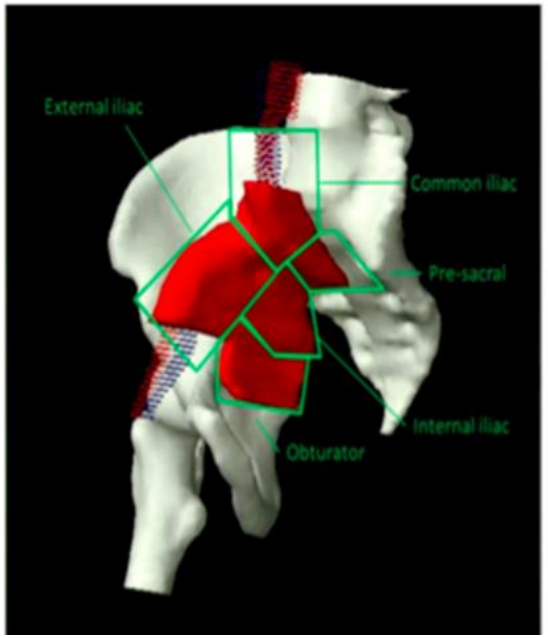
Jak napromieniać w/ch ?
(w dobie diagnostyki PET/TK)

Patterns of Lymph Node Positivity on ^{11}C-acetate PET Imaging in Correlation to the RTOG Pelvic Radiation Field for Prostate Cancer

Chris McClinton, MD,* Maryam Niroumand, MD,† Veer Shah, MBChB,† Jacqueline Hill, MPH,† Reginald Dusing, MD,† Parvesh Kumar, MD,* Xinglei Shen, MD*

Zastosowanie badania PET – cholina i zasad konturowania wg. konsensusu RTOG wykazało, że…….

RTOG Nodal Consensus CTV Contours: High Risk / Locally Advanced Adenocarcinoma of the Prostate



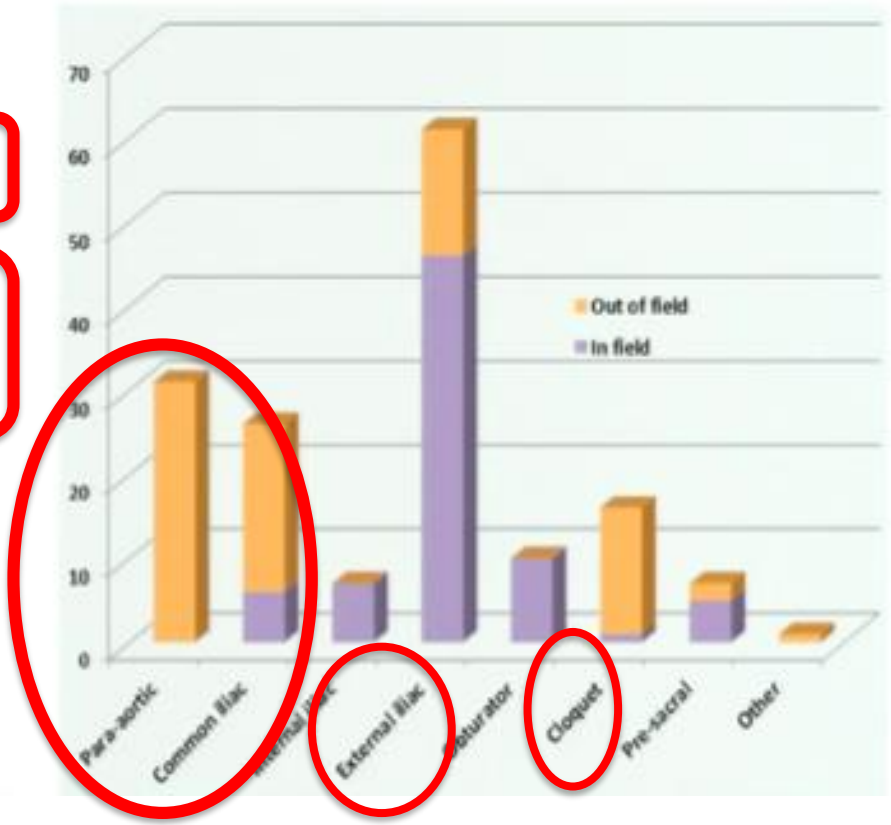
^{11}C-acetate PET

- Rapidly absorbed by cells that are active in fatty acid synthesis, such prostate cancer[3,4]
- Little urinary excretion[5]
- Half-life approximately 20 minutes
- More sensitive than FDG in detection of primary prostate cancer[6,7]
- Sensitivity 87% and specificity 66% for detecting biochemically recur prostate cancer when PSA level is greater than 1.24ng/mL[8]

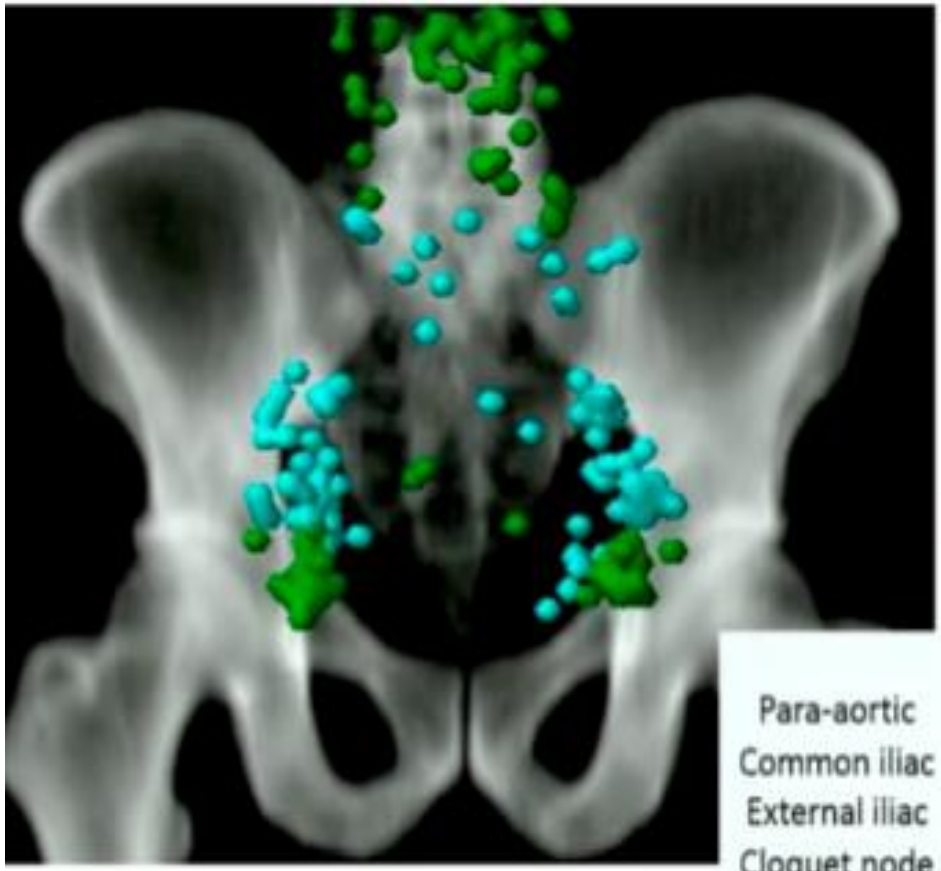
……. 53% wykazanych w/ch poza polem napromieniania, w 78% przypadków co najmniej 1 w/ch poza polem napromieniania (głównie w zakresie w/ch przyaortalnych)

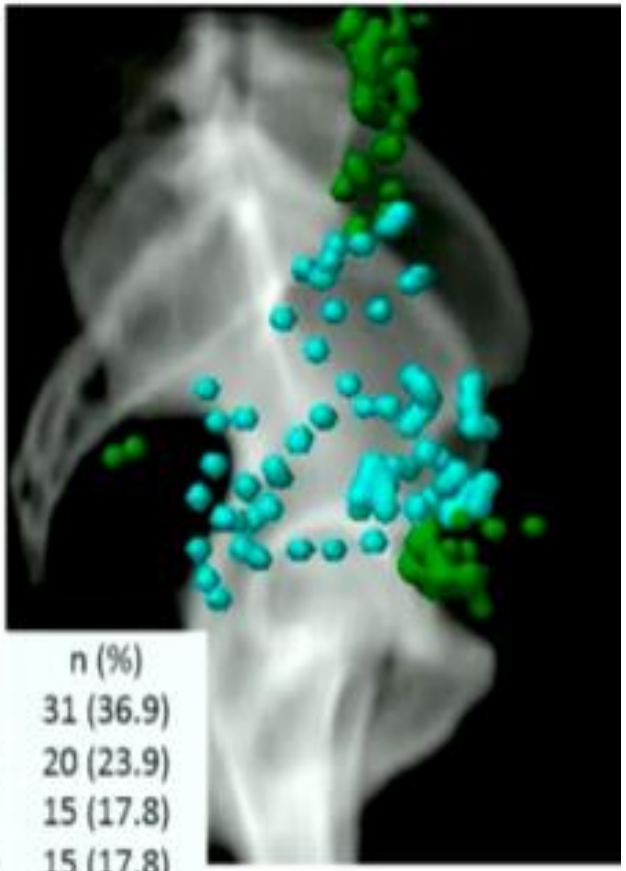
Lymph node distribution

- 159 nodes evaluated
  - 47.2% in-field
  - 52.8% out-of-field
- 78% of patients had at least one out-of-field node



Distribution of out-of-field nodes with standard RTOG field





	n (%)
Para-aortic	31 (36.9)
Common iliac	20 (23.9)
External iliac	15 (17.8)
Cloquet node	15 (17.8)
Internal iliac	0 (0)
Obturator	0 (0)
Pre-sacral	2 (2.4)
Other	1 (1.2)

Conclusion

Based on ^{11}C-acetate PET, the standard RTOG pelvic radiation field for prostate cancer may miss nearly half of all positive nodes

Przy zastosowaniu standardowych (wg. RTOG) rekomendacji, połowa zajętych przerzutami w/ch pozostaje **poza** polami napromieniania!!!!!

EUROPEAN UROLOGY 71 (2017) 37–43

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

European Association of Urology

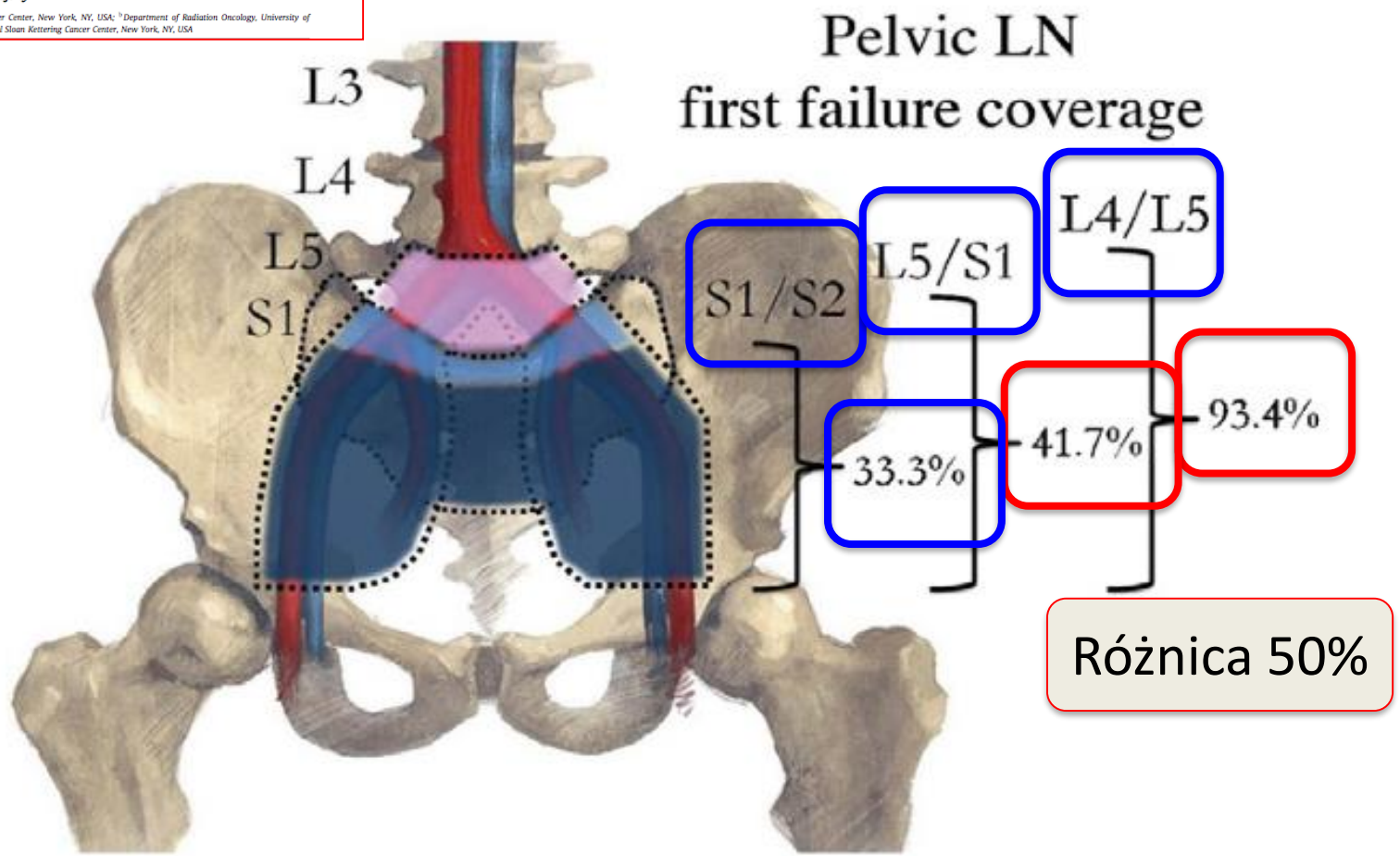
Platinum Priority – Prostate Cancer
Editorial by Cesare Cozzarini on pp. 44–45 of this issue

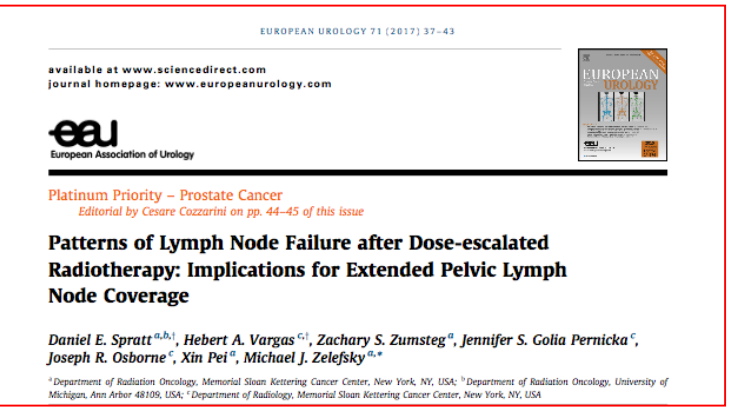
Patterns of Lymph Node Failure after Dose-escalated Radiotherapy: Implications for Extended Pelvic Lymph Node Coverage

Daniel E. Spratt [a,b,†], Hebert A. Vargas [c,†], Zachary S. Zumsteg [a], Jennifer S. Golia Pernicka [c], Joseph R. Osborne [c], Xin Pei [a], Michael J. Zelefsky [a,]*

[a] Department of Radiation Oncology, Memorial Sloan Kettering Cancer Center, New York, NY, USA; [b] Department of Radiation Oncology, University of Michigan, Ann Arbor 48109, USA; [c] Department of Radiology, Memorial Sloan Kettering Cancer Center, New York, NY, USA

- 2694 ch./156 ch. N(+), lata **1992–2008**
- cN0; TK/RM/PET
- RT bez WPRT
- ADT
- Obserwacja – 8,9 lat





EUROPEAN UROLOGY 71 (2017) 37–43

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

European Association of Urology

Platinum Priority – Prostate Cancer
Editorial by Cesare Cozzarini on pp. 44–45 of this issue

Patterns of Lymph Node Failure after Dose-escalated Radiotherapy: Implications for Extended Pelvic Lymph Node Coverage

Daniel E. Spratt [a,b,†], Hebert A. Vargas [c,†], Zachary S. Zumsteg [a], Jennifer S. Golia Pernicka [c], Joseph R. Osborne [c], Xin Pei [a], Michael J. Zelefsky [a,]*

[a] Department of Radiation Oncology, Memorial Sloan Kettering Cancer Center, New York, NY, USA; [b] Department of Radiation Oncology, University of Michigan, Ann Arbor 48109, USA; [c] Department of Radiology, Memorial Sloan Kettering Cancer Center, New York, NY, USA

- u **156** ch. z wieloletnią obserwacją (mediana 8,9 r.)

  N(+) w obrębie jamy brzusznej i/lub miednicy

- u **60** ch. izolowane zmiany w w/ch miednicy

EUROPEAN UROLOGY 71 (2017) 37–43

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

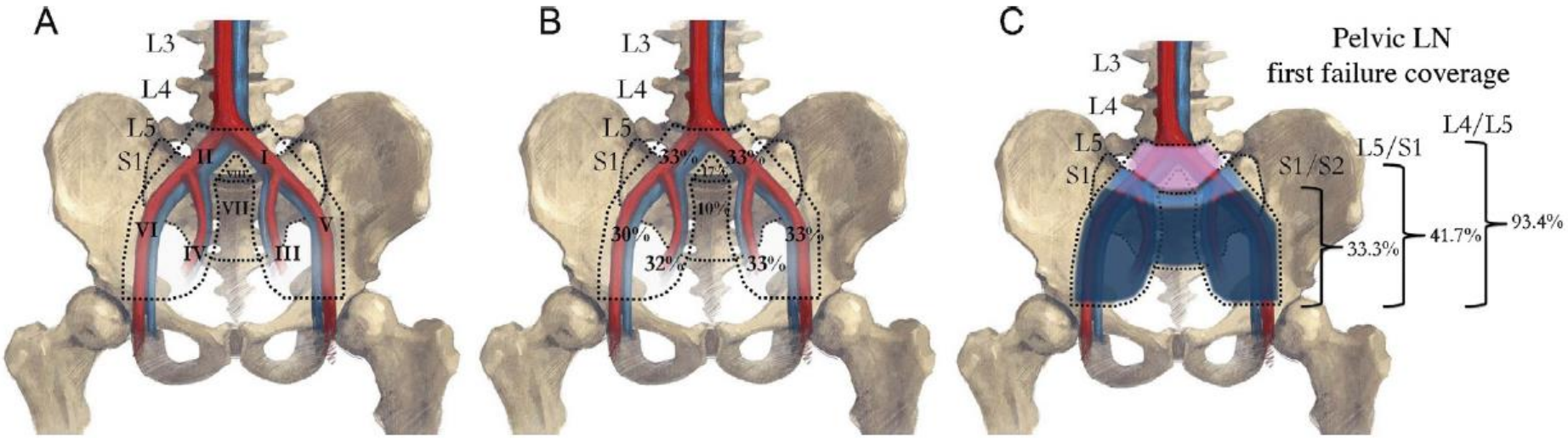
European Association of Urology

Platinum Priority – Prostate Cancer
Editorial by Cesare Cozzarini on pp. 44–45 of this issue

Patterns of Lymph Node Failure after Dose-escalated Radiotherapy: Implications for Extended Pelvic Lymph Node Coverage

Daniel E. Spratt [a,b,†], Hebert A. Vargas [c,†], Zachary S. Zumsteg [a], Jennifer S. Golia Pernicka [c], Joseph R. Osborne [c], Xin Pei [a], Michael J. Zelefsky [a,]*

[a] Department of Radiation Oncology, Memorial Sloan Kettering Cancer Center, New York, NY, USA; [b] Department of Radiation Oncology, University of Michigan, Ann Arbor 48109, USA; [c] Department of Radiology, Memorial Sloan Kettering Cancer Center, New York, NY, USA



U chorych wymagających WPRT, autorzy rekomendują rozszerzenie pól w celu objęcia **w/ch biodrowych wspólnych i podwyższenie górnej granicy do poziomu L4-L5.**

Powyższa rekomendacja jest spójna z wymogami badania RTOG 0924, w którym jest oceniany zysk z WPRT.

Distribution of prostate nodes: a PET/CT-derived anatomic atlas of prostate cancer patients before and after surgical treatment

- Nina-Sophie Hegemann[1] Email author,
- Vera Wenter[2],
- Sonja Spath[1],
- Nadia Kusumo[1],
- Minglun Li[1],
- Peter Bartenstein[2],
- Wolfgang P. Fendler[2],
- Christian Stief[3],
- Claus Belka[1] and
- Ute Ganswindt[1]

Radiation Oncology201611:37

Obszary błędu geograficznego

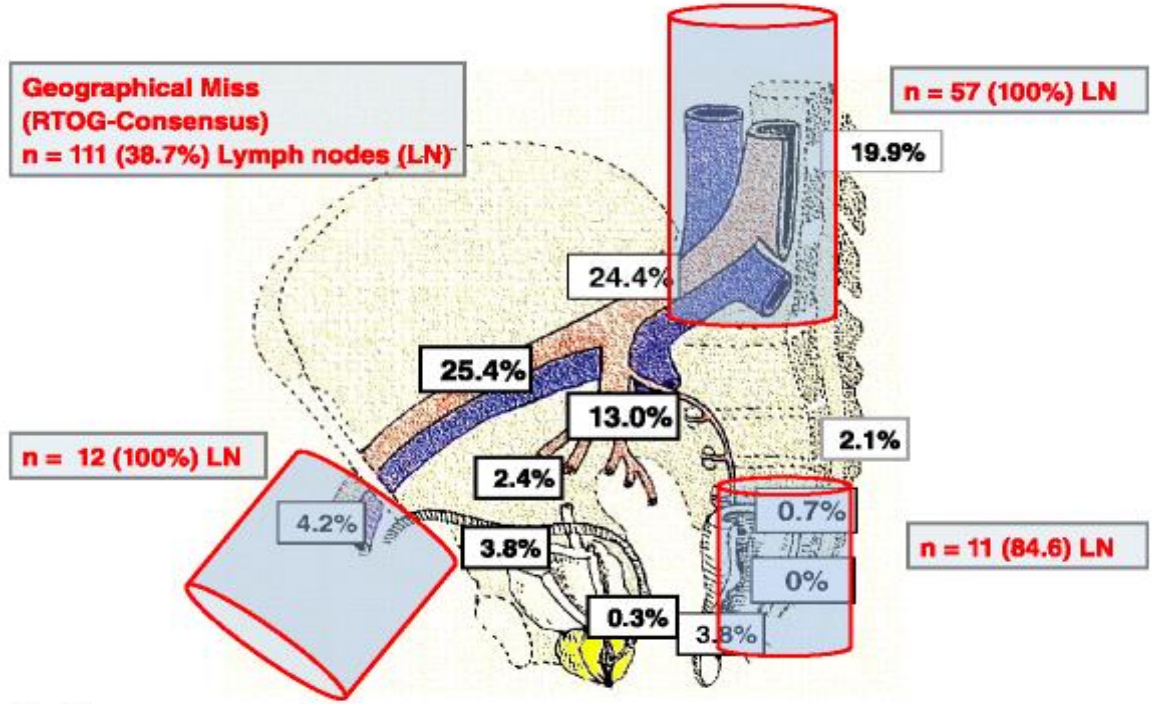


Fig. 2

Schematic distribution of PET positive lymph nodes in all patients (n=119) Anatomical regions and distribution (percentages in *white square frames*) of all detectable PET positive lymph nodes (n=287). Main regions of geographical misses (*red*), when RTOG-Consensus (Lawton et al. [5]) for standard CTV delineation is used

	Total cohort	First failure	
	(n = 156) [a]	Pelvic LN(s) only (n = 60)	ABD ± pelvic LN(s) (n = 31)
Median age, yr (range)	69 (45–87)	67 (45–83)	69 (49–87)
T stage, n (%)			
≤T2a	58 (37.2)	21 (35.0)	14 (45.2)
T2b,c	50 (32.1)	16 (26.7)	12 (38.7)
≥T3a	48 (30.8)	23 (38.3)	5 (16.1)
Gleason score, n (%)			
≤6	19 (12.2)	6 (10.0)	5 (16.1)
7 (3 + 4)	29 (18.6)	7 (11.7)	6 (19.4)
7 (4 + 3)	44 (28.2)	25 (41.7)	3 (9.7)
≥8	64 (41.0)	22 (36.7)	17 (54.8)
Pretreatment PSA, n (%)			
<10 ng/ml	64 (41.0)	22 (36.7)	12 (38.7)
10–20 ng/ml	47 (30.1)	21 (35.0)	8 (25.8)
>20 ng/ml	45 (28.8)	17 (28.3)	11 (35.5)
NCCN risk group, n (%)			
Low	2 (1.3)	0 (0.0)	0 (0.0)
Intermediate	56 (35.9)	19 (31.7)	10 (32.3)
High	98 (62.8)	41 (68.3)	21 (67.7)
Median RT dose, Gy (range)	81.0 (75.6–86.4)	81.0 (75.6–86.4)	86.4 (75.6–86.4)
Neoadjuvant ADT use, n (%)			
Yes	98 (62.8)	41 (68.3)	22 (71.0)
No	58 (37.2)	19 (31.7)	9 (29.0)
Median follow-up, yr (IQR)	8.9 (6.2–12.8)	8.0 (5.3–11.3)	8.3 (5.5–12.7)
Follow-up scan type, n (%)			
CT	117 (75.0)		
MRI	27 (17.3)		
PET/CT	12 (7.7)		

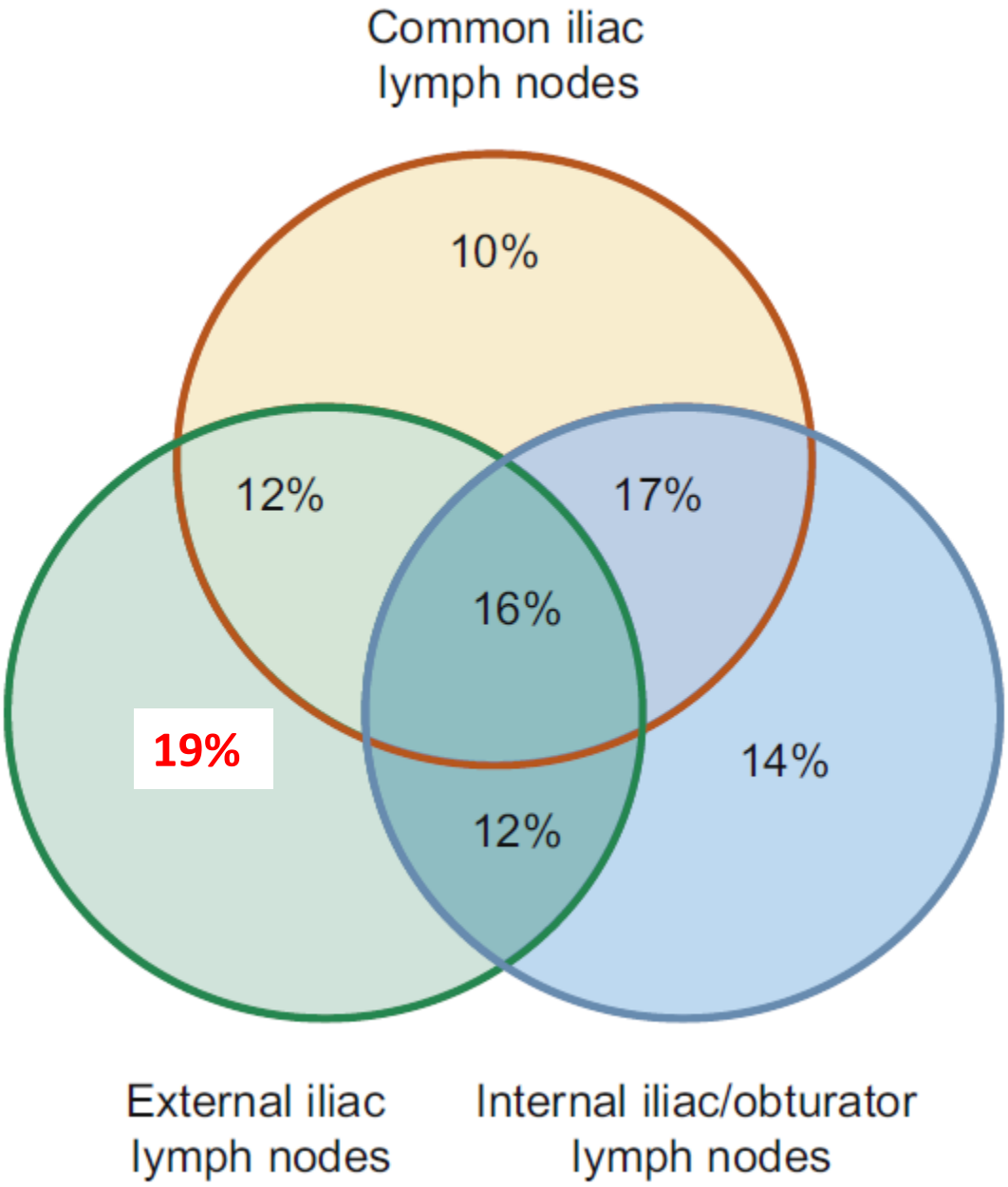
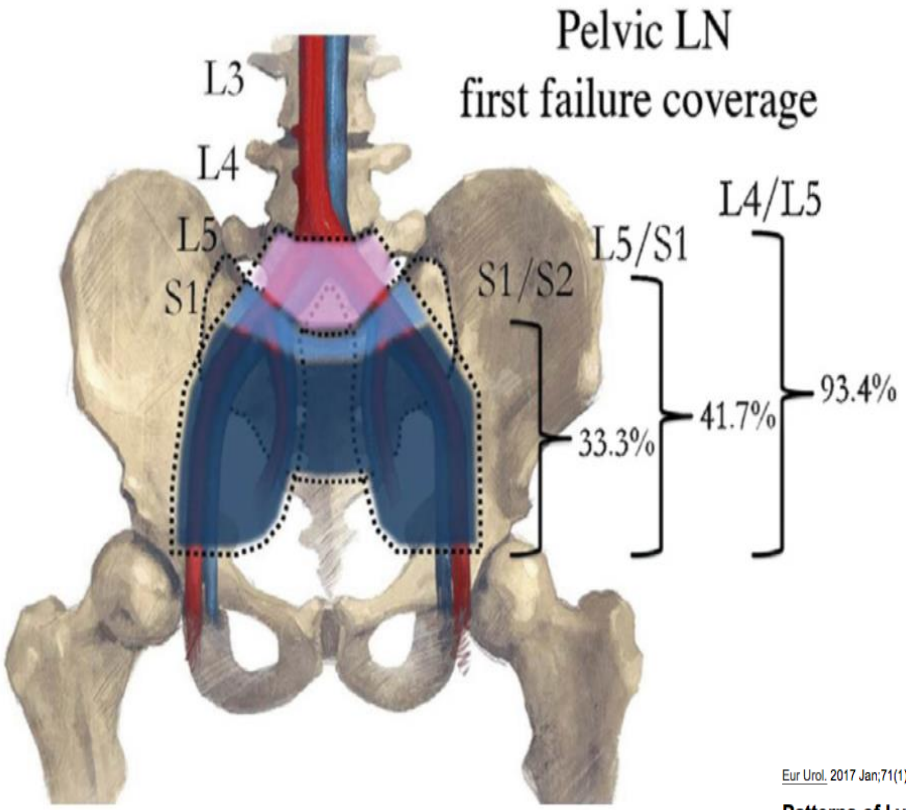


Diagram Venn'a - odsetek zajętych węzłów chłonnych w poszczególnych lokalizacjach anatomicznych u pacjentów, u których obserwowano wznowę węzłową.

Zmiany ograniczone do jednej grupy najczęściej w zakresie **w/ch biodrowych wspólnych (19%),** w 16% przypadków zmiany we wszystkich 3 grupach.

Obszar WPRT – poziom **L4-L5**
górną granicą pól wg. aktualnych rekomendacji



RTOG 0924 **L4/L5**

RTOG 94-13 **L5/S1**

GETUG 01 **S1/S2**

Eur Urol. 2017 Jan;71(1):37-43. doi: 10.1016/j.eururo.2016.07.043. Epub 2016 Aug 11.

Patterns of Lymph Node Failure after Dose-escalated Radiotherapy: Implications for Extended Pelvic Lymph Node Coverage.

Spratt DE[1], Vargas HA[2], Zumsteg ZS[3], Golia Pernicka JS[2], Osborne JR[2], Pei X[3], Zelefsky MJ[4].

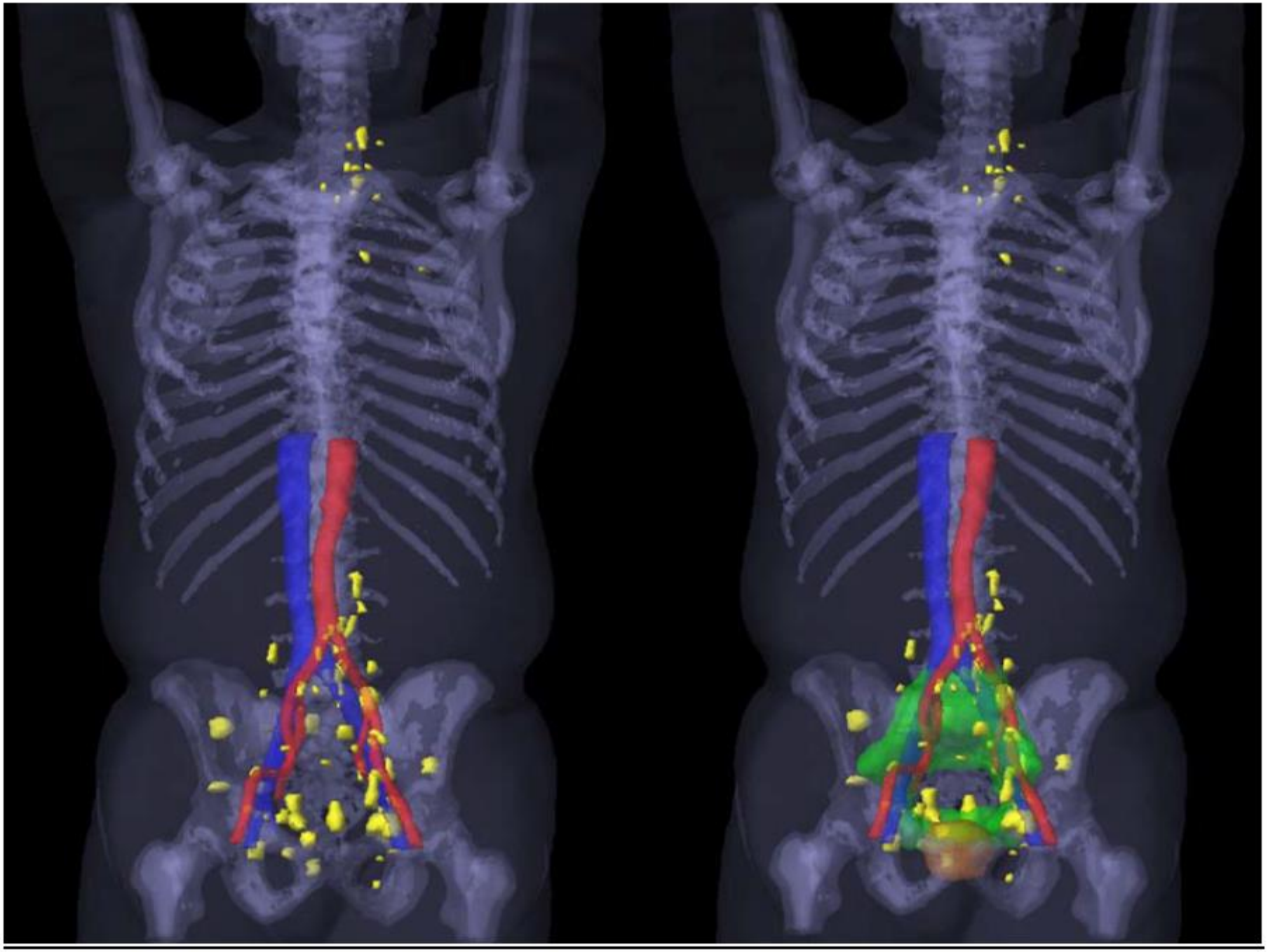
Dobór chorych – planowanie w oparciu o PET/TK PSMA

J Nucl Med. 2018 Nov;59(11):1714-1721. doi: 10.2967/jnumed.118.209387. Epub 2018 Apr 13.

Potential Impact of ^{68}Ga-PSMA-11 PET/CT on the Planning of Definitive Radiation Therapy for Prostate Cancer.

Calais J[1], Kishan AU[2], Cao M[2], Fendler WP[1,3], Eiber M[1], Herrmann K[1,3], Ceci F[1], Reiter RE[4], Rettig MB[4], Hegde JV[2], Shaverdian N[2], King CR[2], Steinberg ML[2], Czernin J[1], Nickols NG[5,4,6].

- 73 ch.
- IR – 11 ch., HR – 33 ch., vHR – 22 ch., N1 – 7 ch.
- ^{68}Ga-PSMA-11 PET/CT
- Zajęcie węzłów u 25/73, przerzuty odległe u 7/73



pN0

- NCCN
  - Target volumes include the prostate bed and may include the whole pelvis according to physician discretion.

Short Term Androgen Deprivation Therapy Without or With Pelvic Lymph Node Treatment Added to Prostate Bed Only Salvage Radiotherapy: The NRG Oncology/RTOG 0534 SPPORT Trial

A Pollack, TG Karrison, AG Balogh, D Low, DW Bruner, JS Wefel, LG Gomella, E Vigneault, JM Michalski, S Angyalfi, H Lukka, SL Faria, G Rodrigues, MC Beauchemin, SA Seaward, AM Allen, DC Monitto, W Seiferheld, and HM Sandler

ASTRO 2018

Wznowa biochemiczna po RP → poop. RT na obszar loży vs poop. RT na obszar loży + krótkotrwała ADT vs poop. WPRT + krótkotrwała ADT

NRG/RTOG 0534/SPPORT Trial Design

A 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

STRATIFY	**SV Involvement** 1. No 2. Yes **Prostatectomy Gleason Score** 1. Gleason ≤ 7 2. Gleason 8-9 **Pre-Radiotherapy PSA** 1. PSA ≥ 0.1 and < 1.0 ng/mL 2. PSA > 1.0 and < 2.0 ng/mL **Pathology Stage** 1. pT2 and margin negative 2. All others	**RANDOMIZE**	**Arm 1: PBRT Alone** PBRT 64.8-70.2 Gy **Arm 2: PBRT + STAD** PBRT 64.8-70.2 Gy + STAD for 4-6 months beginning 2 months before RT **Arm 3: PLNRT + PBRT + STAD** PLNRT to 45 Gy and PBRT to 64.8-70.2 Gy,+ STAD for 4-6 months beginning 2 months before RT

poop. RT na obszar loży vs
poop. RT na obszar loży + krótkotrwała ADT vs
poop. WPRT + krótkotrwała ADT

SV = seminal vesicle; RT = radiotherapy; PBRT = prostate bed RT; PLNRT = pelvic lymph node RT; STAD = neoadjuvant and concurrent short term androgen deprivation

Radiotherapy

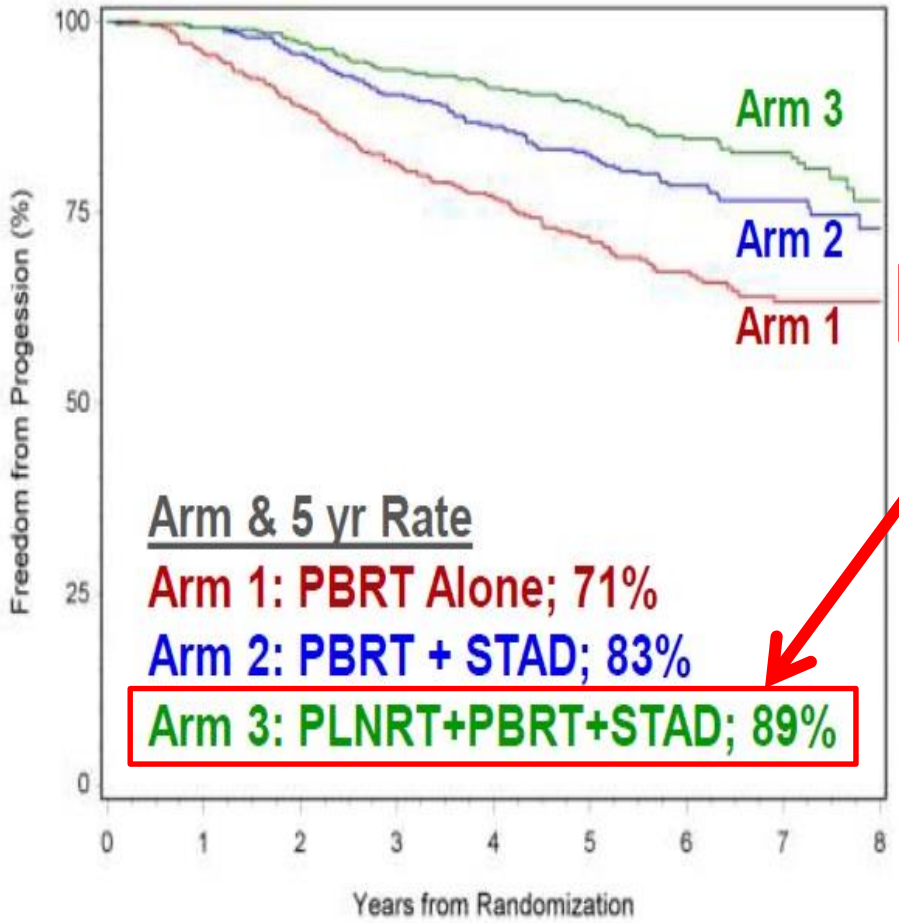
Arms 1 and 2: Prostate Bed Only	Arm 3: PLNRT + PBRT

• 64.8-70.2 Gy
• Consensus target and OAR guidelines
• 3D-CRT or IMRT allowed, with credentialing for the latter
  ○ **IMRT** was stipulated as the preferred method (**87% of Pts**)
  ○ Definition of volumes per ICRU Report #50
	• PLNRT + PBRT: 45 Gy, then reduction
	• PBRT only: 19.8-25.2 Gy
	  ○ Total PBRT dose: 64.8-70.2 Gy
	• Consensus target and OAR volume guidelines

Median prostate bed dose of 68 Gy

FFP for First 1191 Eligible Patients - Interim Analysis Population

Minimum potential FU 5 yr; Median FU 6.4 yr



Arm & 5 yr Rate

Arm 1: PBRT Alone; 71%

Arm 2: PBRT + STAD; 83%

Arm 3: PLNRT+PBRT+STAD; 89%

No. at Risk									
PBRT Alone	399	363	324	286	259	223	150	84	34
PBRT+NC-STAD	398	381	360	329	299	265	170	91	37
PLNRT+PBRT+NC-STAD	394	385	371	352	334	311	208	125	51

5 yr Rate Comparison

Arm 3 vs Arm 1: p<0.0001

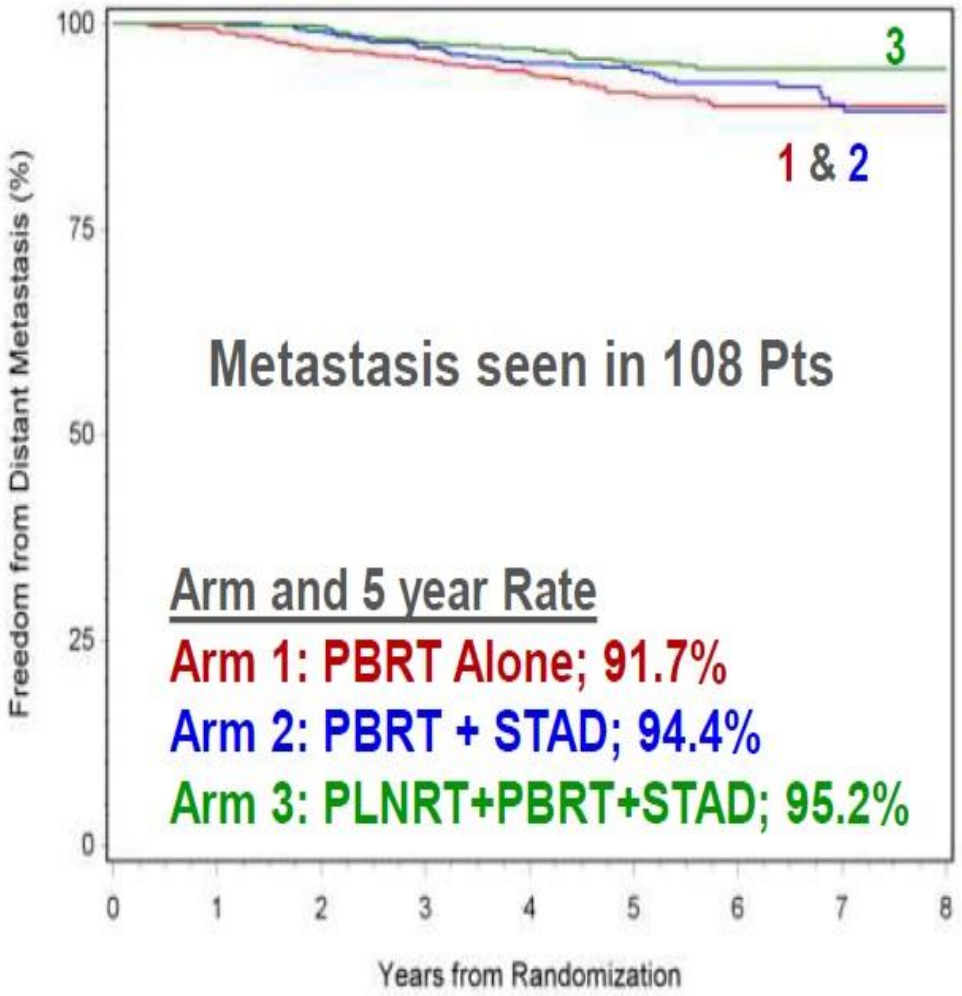
Arm 2 vs Arm 1: p=0.0001

Arm 3 vs Arm 2: p=0.0063

DMC Recommendation

Report findings for all three arms

Freedom from Distant Metastasis: All Eligible Pts



No. at Risk									
PBRT Alone	573	546	522	482	398	302	214	123	54
PBRT+NC-STAD	585	562	547	499	405	315	213	111	48
PLNRT+PBRT+NC-STAD	576	565	551	502	417	330	220	134	56

5 yr Rate Comparison

Arm 3 vs Arm 1: p=0.014

Arm 2 vs Arm 1: p=0.05

Arm 3 vs Arm 2: p=0.28

HRs and 97.5% CIs

3 vs 1: 0.52 (0.30-0.92)

2 vs 1: 0.81 (0.49-1.33)

3 vs 2: 0.64 (0.36-1.14)

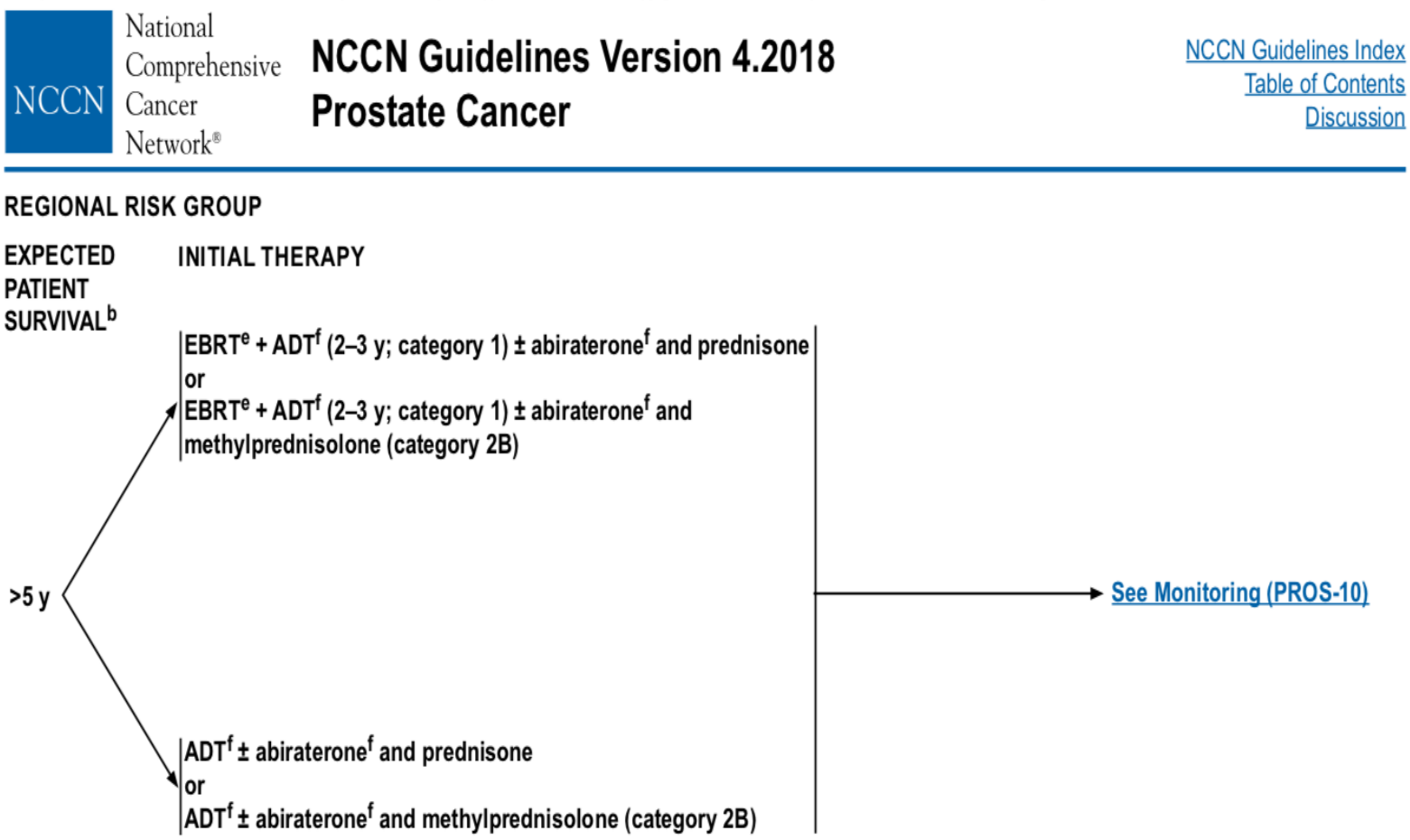
- No statistically significant differences in OS

Wnioski

- U chorych ze wznową biochemiczną po RP, pooperacyjna radioterapia na obszar loży i węzłów chłonnych **(WPRT) z ADT wyprzedzającą (2 mies.) i trwającą 4-6 mies.** jest korzystną opcją w przypadku grupy wysokiego ryzyka w aspekcie **przeżycia bez wznowy**

- **Brak wpływu na przeżycie bez przerzutów odległych i ogólne przeżycie.**

cN1


National Comprehensive Cancer Network®
NCCN Guidelines Version 4.2018
Prostate Cancer
NCCN Guidelines Index
Table of Contents
Discussion
REGIONAL RISK GROUP
EXPECTED PATIENT SURVIVAL[b]
INITIAL THERAPY
>5 y
EBRT[e] + ADT[f] (2–3 y; category 1) ± abiraterone[f] and prednisone
or
EBRT[e] + ADT[f] (2–3 y; category 1) ± abiraterone[f] and methylprednisolone (category 2B)
ADT[f] ± abiraterone[f] and prednisone
or
ADT[f] ± abiraterone[f] and methylprednisolone (category 2B)
See Monitoring (PROS-10)

cN1

- Brak prospektywnych badań wskazujących na zysk w zakresie OS

NCDB	Lin JNCI 2015	636 ch. cN(+), ADT+/-RT.	↓ 5-y OM (o 50%)
SEER	Tward Pract Radiat Oncol 2013	1100 ch. cN(+) RT vs obserwacja.	↑10-yr CSS (63 vs 50%)
SEER	Rusthoven, IJROBP 2014	I 796 ch. cN(+) i 2991 ch. pN(+). ADT +/-RT	↑10-yr OS cN(+) 45% vs 29% ↑10-yr OS pN(+) 65% vs 42%

Eric K. Hansen and Mack Roach III. „Handbook of Evidence-Based Radiation Oncology" 2018.

pN(+)

- Brak prospektywnych badań wskazujących na zysk w zakresie OS

NCDB	Wong Urol Oncol 2016	7225 pacjentów pN+. Leczenie adjuwantowe ADT vs RT+ADT (35%), żadna z metod samodzielnie nie poprawia OS.	↑OS
	Abdollah JCO 2014	1107 pacjentów pN1. ADT(65%) lub RT+ADT (35%). RT ↑8-yr CSS dla pT3b/4 lub (+) marginesy (93% vs. 84%) i dla 3–4 zajętych węzłów (97% vs. 79%).	↑CSS

Eric K. Hansen and Mack Roach III. „Handbook of Evidence-Based Radiation Oncology” 2018.

Wznowy po RP

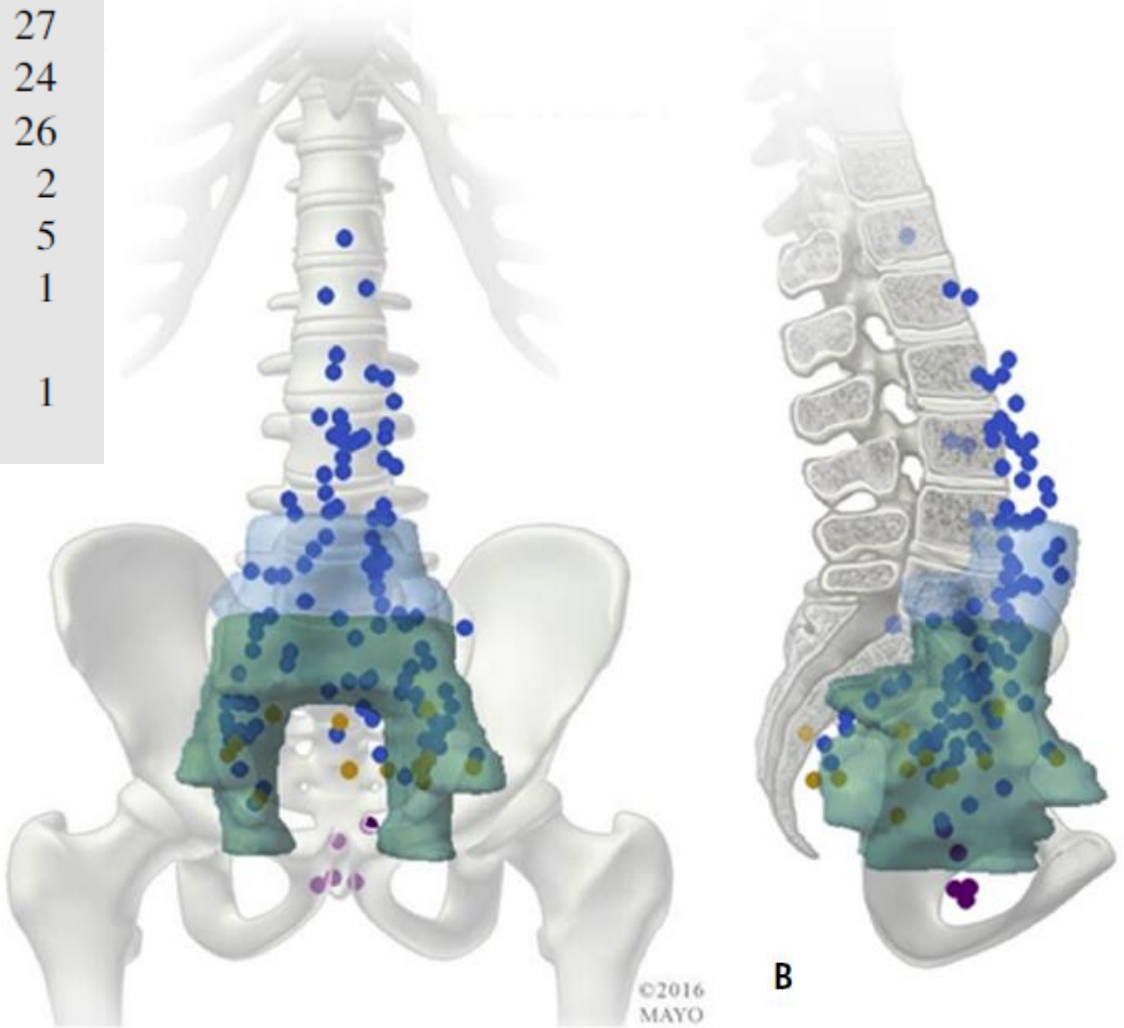
Int J Radiat Oncol Biol Phys. 2017 Mar 1;97(3):526-535. doi: 10.1016/j.ijrobp.2016.11.014. Epub 2016 Nov 17.

Patterns of Recurrence After Postprostatectomy Fossa Radiation Therapy Identified by C-11 Choline Positron Emission Tomography/Computed Tomography.

Parker WP[1], Evans JD[2], Stish BJ[2], Park SS[2], Olivier K[2], Choo R[2], Nathan MA[3], Welch BT[3], Karnes RJ[1], Mynderse LA[1], Pisansky TM[2], Kwon ED[1], Lowe VJ[3], Davis BJ[4].

- 391 ch. ze wznową biochemiczną **po RP**
- Okres leczenia: 2008-2015
- PET-TK (cholina)
- w 41 przypadkach 121 miejsc wznów

Location of recurrence sites (n=121)	
Prostatic fossa	5
Pelvic lymph node sites	57
Perirectal lymph nodes	6
Presacral lymph nodes	3
Internal iliac lymph nodes	15
Obturator lymph nodes	6
External iliac lymph nodes	27
Common iliac lymph node sites	24
Retroperitoneal lymph node sites	26
Pelvic osseous sites	2
Extrapelvic osseous sites	5
Distant nodal site (left supraclavicular node)	1
Visceral site (right pleural nodule, biopsy proven)	1



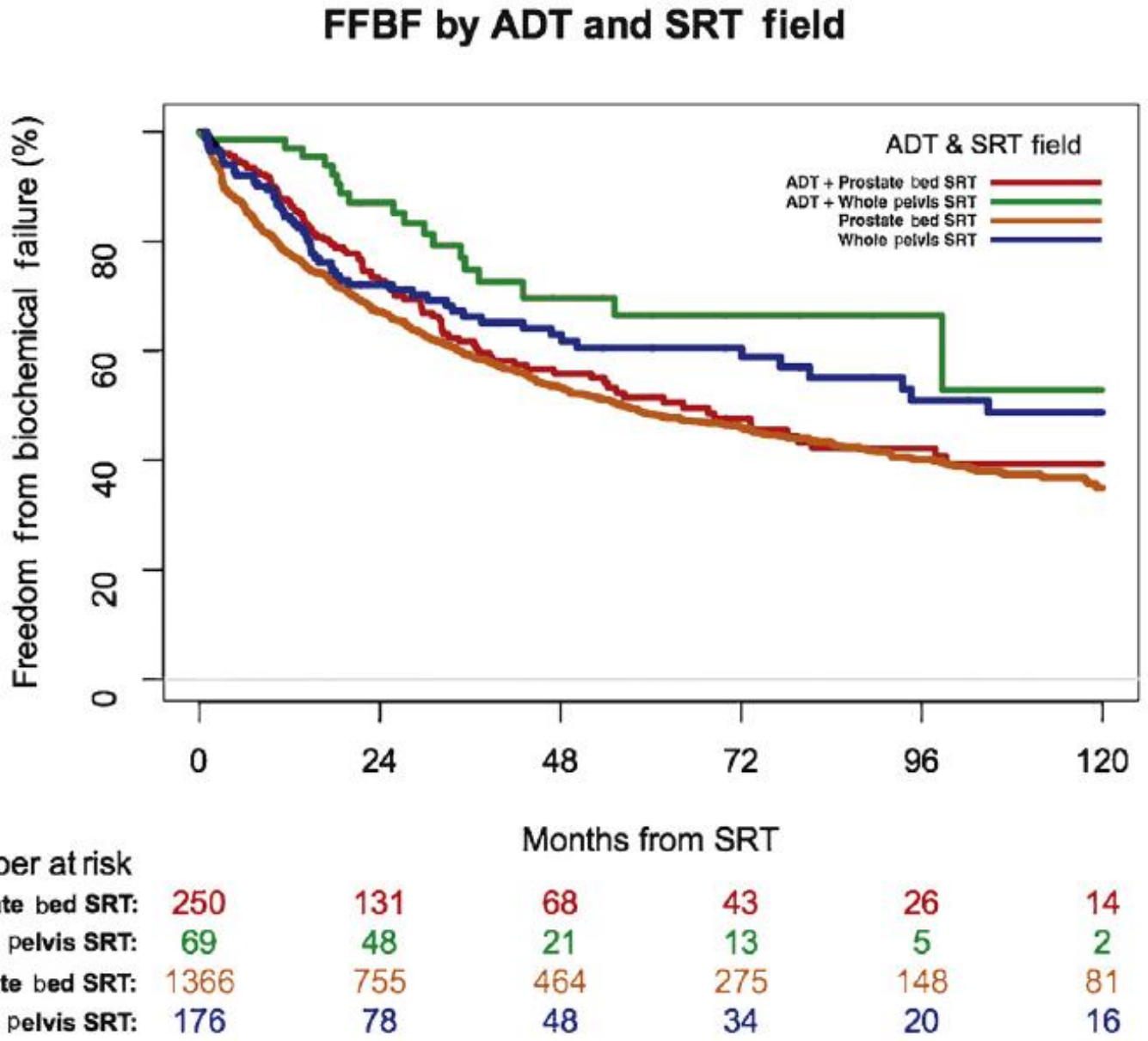
Eur Urol. 2018 Jul;74(1):99-106. doi: 10.1016/j.eururo.2017.10.009. Epub 2017 Nov 9.

Multi-institutional Evaluation of Elective Nodal Irradiation and/or Androgen Deprivation Therapy with Postprostatectomy Salvage Radiotherapy for Prostate Cancer.

Ramey SJ[1], Agrawal S[2], Abramowitz MC[3], Moghanaki D[4], Pisansky TM[5], Efstathiou JA[6], Michalski JM[7], Spratt DE[8], Hearn JWD[8], Koontz BF[9], Liauw SL[10], Pollack A[1], Anscher MS[11], Den RB[12], Stephans KL[13], Zietman AL[6], Lee WR[9], Stephenson AJ[13], Tendulkar RD[13].

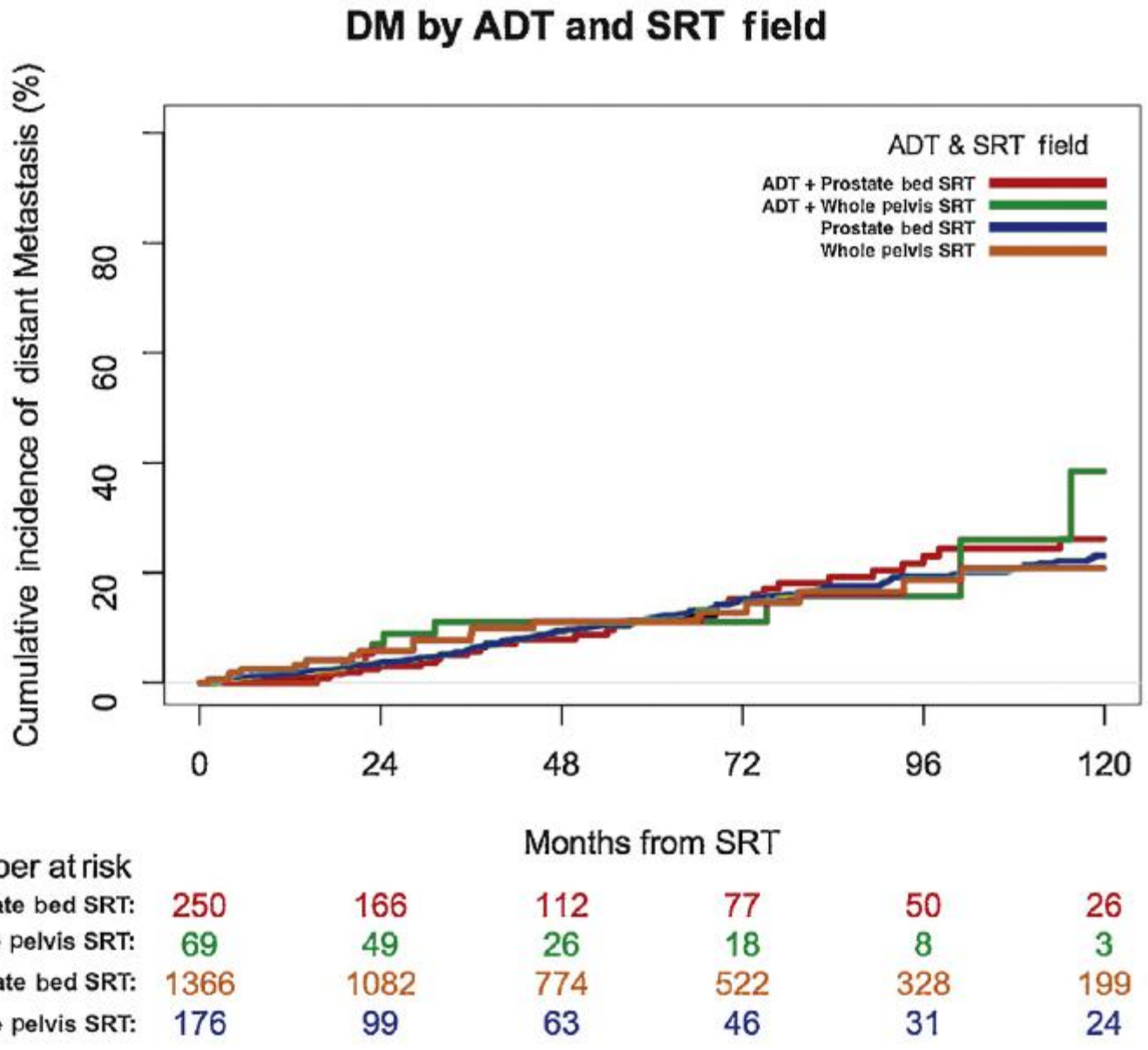
- Kompilacja baz danych z 10 ośrodków
- 1861 ch.
- Okres leczenia:1987-2013
- Mediana obserwacji → 51 mies.
- WPRT u 245 ch. (13,2%),
- 176 ch. wyłączne leczenie, 69 ch. + ADT

WPRT;
wpływ na przeżycie bez wznowy biochemicznej



	Multivariable	
	Hazard ratio (95% CI)	*p* value
RT field		
WPRT	Reference	
PBRT	1.82 (1.44–2.31)	<0.001
ADT use		
Yes	Reference	
No	1.70 (1.38–2.11)	<0.001
RT dose (Gy)		
<66.0	Reference	
≥66.0	0.78 (0.67–0.90)	<0.001
RT year		
Continuous	1.01 (0.99–1.02)	0.54
Pre-RT PSA (ng/ml)		
>2.0	Reference	
>1.0–2.0	0.86 (0.67–1.1)	0.23
0.51–1.0	0.61 (0.47–0.77)	<0.001
0.21–0.50	0.43 (0.34–0.54)	<0.001
≤0.20	0.28 (0.21–0.36)	<0.001
Gleason score		
8–10	Reference	
7	0.69 (0.59–0.81)	<0.001
Seminal vesicle invasion		
Absent	Reference	
Present	1.39 (1.16–1.65)	<0.001
Extraprostatic extension		
Absent	Reference	
Present	1.25 (1.06–1.47)	0.02
Surgical margins		
Negative	Reference	
Positive	0.70 (0.59–0.81)	<0.001

WPRT;
bez wpływu na przeżycie bez odległych przerzutów



	Multivariable	
	Hazard ratio (95% CI)	*p* value
RT field		
WPRT	Reference	
PBRT	1.06 (0.74–1.52)	0.76
ADT use		
Yes	Reference	
No	1.36 (0.96–1.94)	0.09
RT dose (Gy)		
<66.0	Reference	
≥66.0	0.98 (0.75–1.28)	0.86
RT year		
Continuous	1.00 (0.97–1.03)	0.86
Pre-RT PSA (ng/ml)		
>2.0	Reference	
>1.0–2.0	0.69 (0.47–1.03)	0.07
0.51–1.0	0.50 (0.35–0.72)	<0.001
0.21–0.50	0.33 (0.22–0.50)	<0.001
≤0.20	0.20 (0.12–0.34)	<0.001
Gleason score		
8–10	Reference	
7	0.54 (0.41–0.70)	<0.001
Seminal vesicle invasion		
Absent	Reference	
Present	1.80 (1.34–2.42)	<0.001
Extraprostatic extension		
Absent	Reference	
Present	1.14 (0.84–1.55)	0.41
Surgical margins		
Negative	Reference	
Positive	0.75 (0.59–0.97)	0.03

Jaka rola WPRT?
badanie RTOG 0534
PBRT vs PBRT+ADT vs WPRT+ADT

	SV Involvement		
	1. No		
S	2. Yes	**R**	**Arm 1: PBRT Alone**
T		**A**	PBRT 64.8-70.2 Gy
R	**Prostatectomy Gleason Score**	**N**	
A	1. Gleason ≤ 7	**D**	
T	2. Gleason 8-9	**O**	**Arm 2: PBRT + NC-STAD**
I		**M**	PBRT 64.8-70.2 Gy + NC-STAD for 4-6 months,
F	**Pre-Radiotherapy PSA**	**I**	beginning 2 months before RT
Y	1. PSA ≥ 0.1 and ≤ 1.0 ng/mL	**Z**	
	2. PSA > 1.0 and < 2.0ng/mL	**E**	
			Arm 3: PLNRT + PBRT + NC-STAD
	Pathology Stage		PLNRT to 45 Gy and PBRT to 64.8-70.2 Gy,
	1. pT2 and margin negative		NC-STAD for 4-6 months,
	2. All others		beginning 2 months before RT

SV = seminal vesicle; RT = radiotherapy; PBRT = prostate bed RT; PLNRT = pelvic lymph node RT; NC-STAD = neoadjuvant and concurrent short term androgen deprivation

Konturowanie węzłów chłonnych

Int J Radiat Oncol Biol Phys. 2009 Jun 1;74(2):383-7. doi: 10.1016/j.ijrobp.2008.08.002. Epub 2008 Oct 22.

RTOG GU Radiation oncology specialists reach consensus on pelvic lymph node volumes for high-risk prostate cancer.

Lawton CA[1], Michalski J, El-Naqa I, Buyyounouski MK, Lee WR, Menard C, O'Meara E, Rosenthal SA, Ritter M, Seider M.

Określono 3 główne drogi drenażu limfatycznego:

1. Dogłowowy (węzły biodrowe zewnętrzne)
2. Bocznie (węzły biodrowe wewnętrzne)
3. Tylny (węzły przedkrzyżowe na poziomie S1–S3)

Granice pól

- górna granica *L5/S1 (RTOG consensus 2009*), **L4/L5 (RTOG 0924)**
- naczynia biodrowe z 7mm marginesem (z wyłączeniem jelit, kości, pęcherza)
- węzły chłonne przedkrzyżowe 10mm do przodu od k. krzyżowej (z wyłączeniem jelit, kości, pęcherza)
- dolna granica węzłów biodrowych zewnętrznych szczyt głów k. udowych
- dolna granica ww. zasłonowych szczyt k. łonowych

Etapy konturowania

- Początek konturowania - poziom L5-S1 – podział tętnic biodrowych wspólnych na biodrowe wewn. i zewn.
- Wokół naczyń – 7mm marginesu a do strony brzusznej do 1cm
- Konturowanie węzłów przedkrzyżowych zakończone od strony nóg na wysokości S3 (margines 10 mm)
- Opcjonalnie – objęcie węzłów biodrowych wspólnych i okołoodbytniczych
- Konturowanie węzłów biodrowych zewnętrznych zakończone na poziomie głów kości udowych
- Konturowanie węzłów zasłonowych zakończone na poziomie spojenia łonowego

DVH Consensus: Organs At Risk (OARs)

- Rectum: 2 data points:
  - » 50 Gy ≤ 50%
  - 70 Gy ≤ 20%
- Bladder: 2 data points:
  - 55 Gy ≤ 50%
  - 70 Gy ≤ 30%
- Femoral Heads <5% @ 50Gy
- Small Bowel 0% @ 52Gy
- Large Bowel Same as Rectum
- Pubic Bone No Constraints
- Iliac Crests No Constraints

Dotyczą klasycznego frakcjonowania!

Consensus Guidelines and Contouring Atlas for Pelvic Node Delineation in Prostate and Pelvic Node Intensity Modulated Radiation Therapy.

Harris VA[1], Staffurth J[2], Naismith O[3], Esmail A[4], Gulliford S[3], Khoo V[1], Lewis R[5], Littler J[6], McNair H[7], Sadoyze A[8], Scrase C[4], Sohaib A[9], Syndikus I[6], Zarkar A[10], Hall E[5], Dearnaley D[11]; PIVOTAL Trialists.

Author information

Abstract

PURPOSE: The purpose of this study was to establish reproducible guidelines for delineating the clinical target volume (CTV) of the pelvic lymph nodes (LN) by combining the freehand Royal Marsden Hospital (RMH) and Radiation Therapy Oncology Group (RTOG) vascular expansion techniques.

A Study of Prostate and pelvIs Versus prOsTate Alone Treatment for Locally Advanced Prostate Cancer (PIVOTAL)

ClinicalTrials.gov Identifier: NCT01685190

Recruitment Status : Active, not recruiting
First Posted : September 14, 2012
Last Update Posted : August 8, 2018

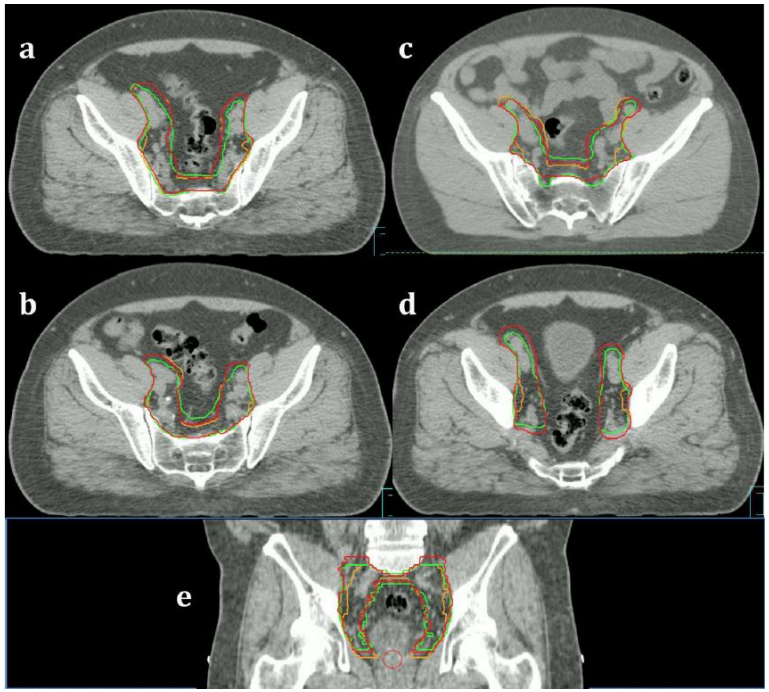
Rekomendacje dotyczące zasad konturowania w/ch różnią się pomiędzy organizacjami europejskimi, amerykańskimi i australijskimi

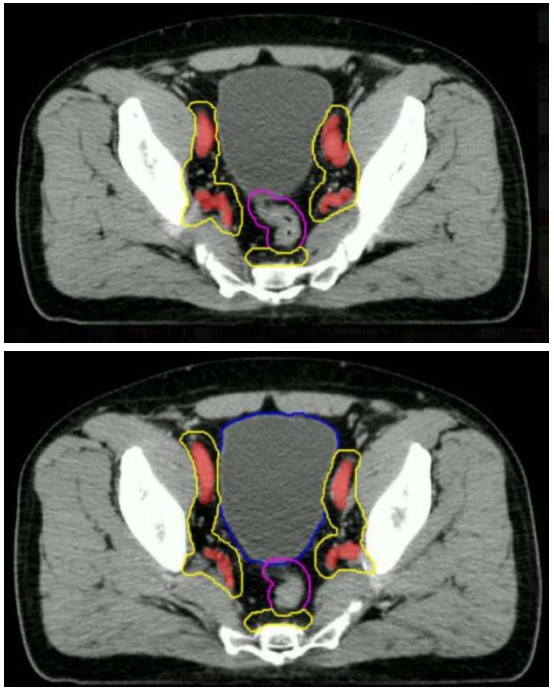
Rekomendacje

Site	RTOG guidelines	PIVOTAL guidelines	Reason for differences between techniques
Superior extent of LN-CTV	L5/S1 interspace	Lower border of L5 vertebra as seen on sagittal CT	L5/S1 interspace is typically angled, therefore selection of different points within the interspace can result in a discrepancy in LN-CTV superior extent by several mm, but specifying the lower border of L5 ensures consistency
Inferior extent of LN-CTV	Top of pubic symphysis	1 cm above the top of the pubic symphysis	There was considerable variation in RTOG group expert opinion about the inferior extent of LN-CTV (3 cm superior to the prostatic base to the level of the obturator foramina), (22). Group consensus was that 1 cm above the pubic symphysis mirrored practice in an "average" patient but that there will be variations depending on individual patient anatomy. This is supported by studies of the position of sentinel nodes by Ganswindt et al (26).
Structures to be edited out of LN-CTV	Bowel Bladder Bone	BEV (bowel + 3-mm margin) Bladder Rectum Bone Muscle	Exclusion of BEV reduces volume of bowel within the LN-PTV; Muscle is not mentioned in RTOG guidance, although it is edited out of LN-CTV in the RTOG atlas
Presacral nodal volume	S1-S3 inclusive 10-mm strip anterior to sacrum	S1-S3 inclusive 12-mm strip anterior to sacrum	We reduced the width of the presacral strip used in the RMH guidelines based upon Dinniwell et al (14), who used a 12-mm strip. Expert opinion has shown considerable variation in definitions of the anterior limits of presacral nodes of between 1.5 and 3 cm (22)
Any further instructions	Connect the external and internal iliac contours on each slice	1. Connect internal and external iliac volumes with an 18-mm strip (measured from medial surface of bony pelvis) 2. Use IV contrast to aid identification of vessels; 3. Obturator region is an 18-mm wide strip measured from the inner surface of bony pelvic side wall; 4. Inclusion of any small white dots	RTOG guidance was not explicit on how to connect internal and external iliac contours. IV contrast enhances ability to determine the location of vessels and therefore aids delineation. Taylor et al (13) suggest that 99% of obturator lymph nodes are encompassed by an 18mm strip measured from the medial aspect of the bony pelvis. Small white dots may represent small blood vessels and associated LNs (14). Clinician discretion is required to include any suspicious areas

Rekomendacje

Site	RTOG guidelines	PIVOTAL guidelines	Reason for differences between techniques
Superior extent of LN-CTV	L5/S1 interspace	Lower border of L5 vertebra as seen on sagittal CT	L5/S1 interspace is typically angled, therefore selection of different points within the interspace can result in a discrepancy in LN-CTV superior extent by several mm, but specifying the lower border of L5 ensures consistency
Inferior extent of LN-CTV	Top of pubic symphysis	1 cm above the top of the pubic symphysis	There was considerable variation in RTOG group expert opinion about the inferior extent of LN-CTV (3 cm superior to the prostatic base to the level of the obturator foramina), (22). Group consensus was that 1 cm above the pubic symphysis mirrored practice in an "average" patient but that there will be variations depending on individual patient anatomy. This is supported by studies of the position of sentinel nodes by Ganswindt et al (26).





Adv Radiat Oncol. 2016 Jan-Mar; 1(1): 51–58.
Published online 2015 Dec 17. doi: [10.1016/j.adro.2015.11.004]
PMCID: PMC5506713
PMID: 28799574

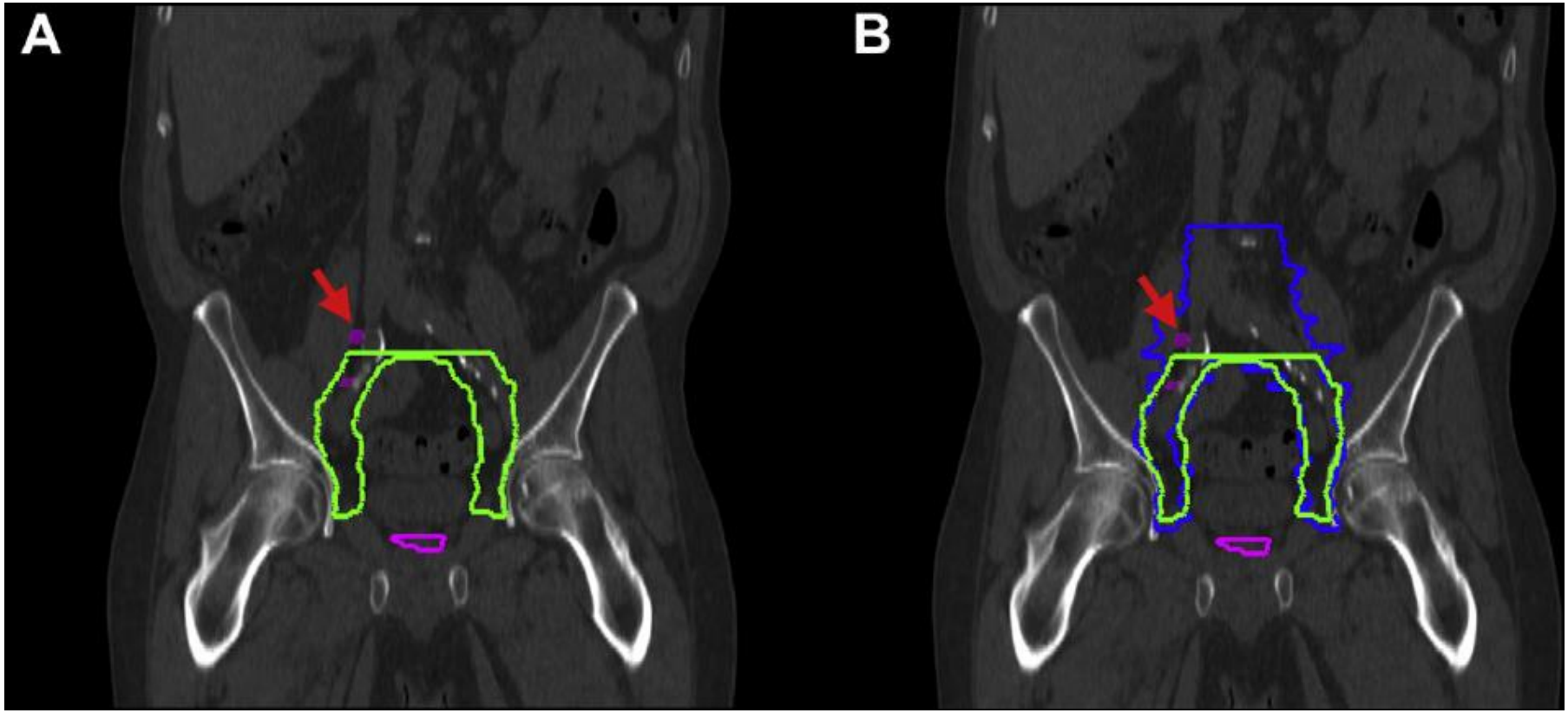
Sentinel lymph node imaging guided IMRT for prostate cancer: Individualized pelvic radiation therapy versus RTOG guidelines

Chien P. Chen, MD, PhD,[a] Julian Johnson, MD,[b] Youngho Seo, PhD,[c] Vivian K. Weinberg, PhD,[d] Katsuto Shinohara, MD,[e] I-Chow J. Hsu, MD,[b] and Mack Roach, III, MD[b,*]

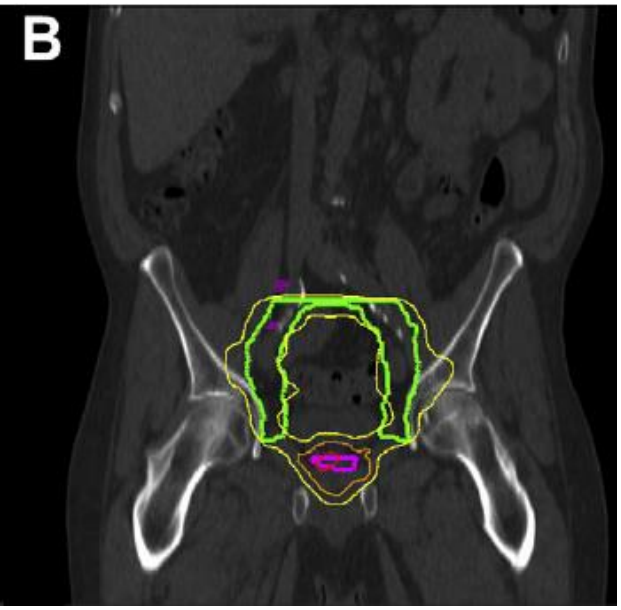
Węzeł wartowniczy w RGK - implikacje topograficzne

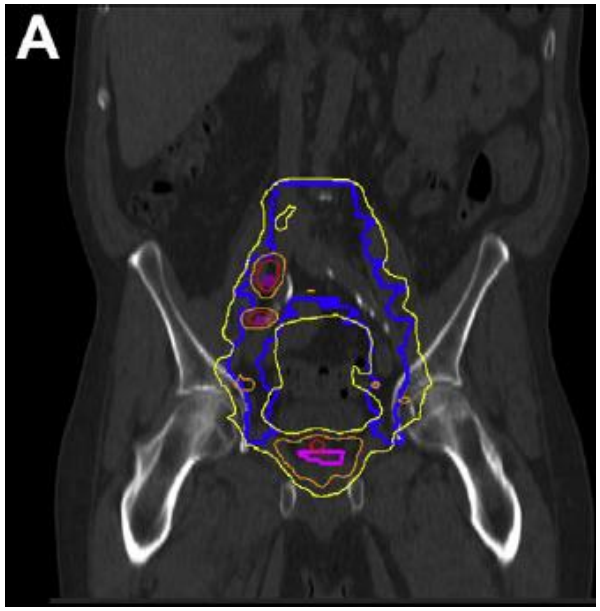
„Briefly, filtered Tc-sulfur nanocolloid was divided equally into 6 fractions and administered evenly into three locations (apex, mid-gland, and base) for each lobe. After 1.5 to 3 hours of tracer administration, a combined single-photon emission computed tomography (SPECT)/CT was performed.”

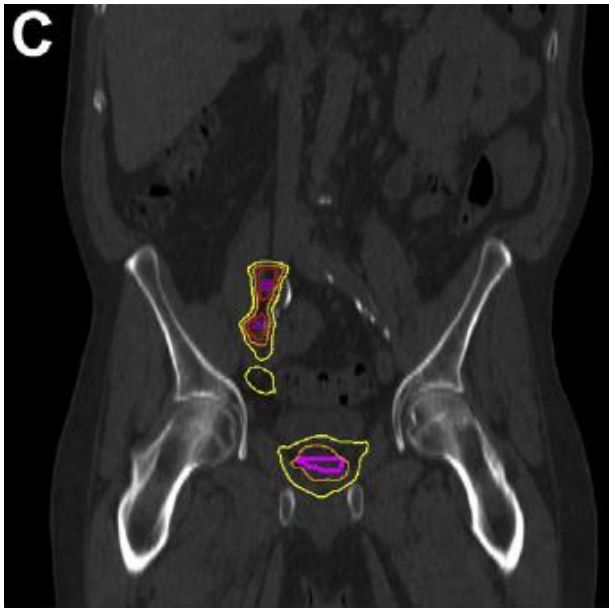
Węzeł wartowniczy w RGK - implikacje topograficzne



Węzeł wartowniczy w RGK - implikacje topograficzne







Czy wskazane napromienianie elektywne + boost, czy wyłącznie selektywne na obszar zajętych w/ch?

Marginesy?

Int J Radiat Oncol Biol Phys. 2018 Jan 1;100(1):68-77. doi: 10.1016/j.ijrobp.2017.08.044. Epub 2017 Sep 8.

Image Guided Radiation Therapy Strategies for Pelvic Lymph Node Irradiation in High-Risk Prostate Cancer: Motion and Margins.

Kershaw L[1], van Zadelhoff L[2], Heemsbergen W[3], Pos F[3], van Herk M[4].

*„Image guided radiation therapy **based on bony anatomy requires larger prostate and SV margins, and guidance on prostate requires larger LN margins**. Neither guidance strategy is optimal, and a combination of the 2 or treatment adaptation after a number of fractions might be preferable."*

Zastosowanie standardowej techniki IGRT do WPRT wymaga poszerzenia marginesów - w/ch jeżeli punktem odniesienia jest gruczoł krokowy lub stercza gdy punktem odniesienia są w/ch!!!!!!!!!!!!