Prostate cancer volume at biopsy vs. findings at Prostatectomy

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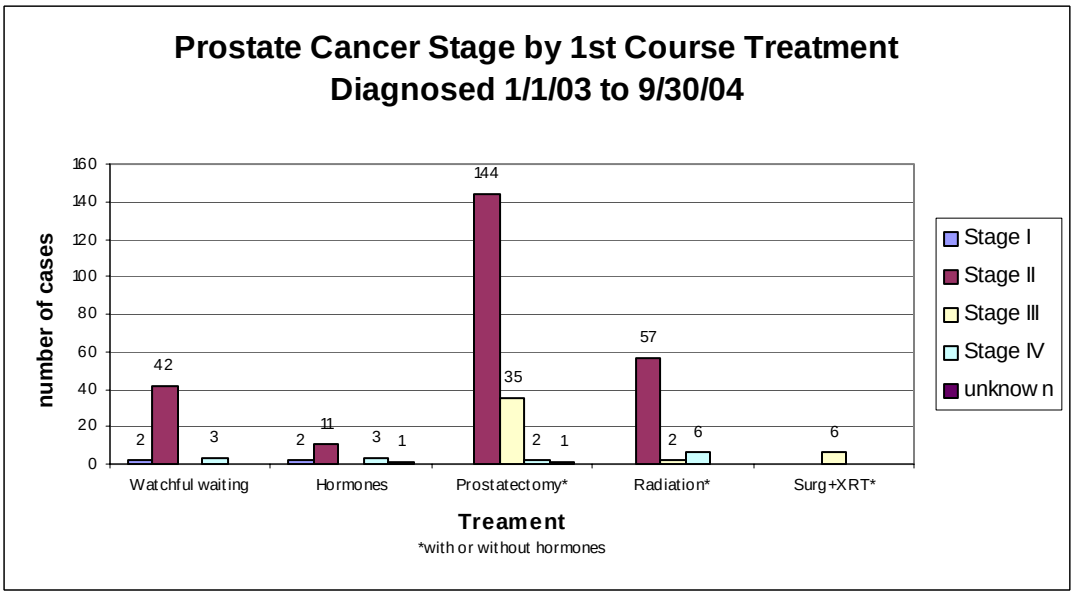
By Shelly Smits, RHIT, CCS, CTR
Ian Thompson, MD

Data Source: Cancer registry data of prostate cancer treated with prostatectomy from January 1, 2003 through September 30, 2004. Only patients with known pre-treatment PSA, known number of core biopsies positive and the length positive, and stated volume at prostatectomy are included.

Reason for Report: To determine if the reported PSA and amount of cancer seen at biopsy can predict which patients have clinically insignificant cancer at prostatectomy.

Findings: There were 317 cases of prostate cancer diagnosed and treated for the period of January 1, 2003 through September 30, 2004. There were 188 (59.3%) cases of prostate cancer treated with prostatectomy (with or without postop radiation) during that interval.

The graph below shows the number of cases by stage within each treatment group (regardless if hormones were given) with prostatectomy alone, radiation alone or prostatectomy followed by radiation therapy.



The breakdown of prostate cancer patients treated with prostatectomy with a reported PSA preop and "minimal disease" volume at biopsy is as follows:
Minimal disease at biopsy is defined in this study as a single core positive with less than 3mm of length)

Number with known PSA & 1 biopsy core positive, 3 mm or less = 30

Average tumor volume found at surgery (range=<0.2 to 4cc) = 1.02 cc
Average Gleason score at surgery = 6

Gleason 5 =2
Gleason 6 = 21
Gleason 7 = 6
No cancer found = 1

Pathologic T stage (all Stage II)

T2A (one side) = 12 (40%)
T2C (bilateral) = 18 (60%)

Preop PSA value range =1.6 to 47.06

Cases with PSA lower than 4 = 4
PSA of 4 to 10.0 = 23
PSA over 10 = 3

The table below shows the average tumor volume and Gleason score at surgery. It also shows the number of patients with a change in Gleason score from biopsy to surgery and those with <1 mm of tumor at biopsy.

Prostate cancers diagnosed 1/1/03 to 9/30/04
1 core pos with 3mm or less disease

PSA	# of pts.	Avg. tumor vol	Avg. Gleason score	# with change Gleason score	# with only <1mm at bx
PSA <4	4	0.3 cc range=0 to 1	6	2 all down score	1
PSA 4-10	23	1.2 cc range=0.05 to 4	6	6 all up score	5
PSA >10	3	0.47 cc range=0.01 to <1	6	0	0

The 5 cases with PSA between 4-10 that had <1 mm of tumor at biopsy had the following tumor volumes recorded at prostatectomy: 2 cc, 3 cc, 0.2 cm, 0.05 cc and 1.2 cc

The 1 case with PSA less than 4 that had <1 mm of tumor at biopsy had the following tumor volume recorded at prostatectomy: 0cc

Using a common literature definition of "insignificant cancer" at prostatectomy of <0.5 cc and/or Gleeson 7 or greater Cancer, the following distribution was noted.

PSA	**# of pts with vol of >0.5 cc**	**Gleason score ≥ 7**	**Both Gleason score ≥ 7 & vol >0.5 cc**
PSA <4	1/4	0	0
PSA 4-10	15/23	6	6
PSA >10	1/3	0	0

Looking at Gleason score alone, the following findings were observed for the patients found with Gleason 7 cancer at Prostatectomy.

Gleason 7 cancers		
PSA	**Core Length**	**Volume at Surgery**
4.6	0.5 mm	3 cc
4.7	3 mm	2 cc
8.5	0.5 mm	1.2 cc
7.2	2 mm	4 cc
4.3	3 mm	3 cc
8.4	2.4 mm	2.5 cc

Discussion

The definition of "clinically insignificant" prostate cancer is a subject of much discussion in the literature. A literature search revealed a variety of definitions. Complex definitions included a formula involving PSA density, Gleason score, <3 cores with <50% involvement. Another formula involved Gleason score correlated with age and predicted doubling time to reach 20cc.

Although one article's definition for "insignificant cancer" required the cancer to be less than 0.2cc, there were a large number of studies that defined "insignificant cancer" as less than 0.5cc and/or Gleason score of less than 7.

Using the most common definition of "insignificant cancer" (0.5cc at surgery + Gleason 7) only 6 of the group of 30 patients with a single biopsy with <3mm had a significant cancer. 2 of those patients had only 1mm or less at the time of core biopsy. All of these patients had a PSA greater than 4.

If the more liberal definition of "insignificant cancer" (0.5cc at surgery) is used, 17 of the of the group of 30 patients with a single biopsy with <3mm had a significant cancer. 3 of those patients had only 1mm or less at the time of core biopsy. All of these patients had a PSA greater than 4.

Other interesting facts:

Number of patients receiving radiation therapy consults prior to prostatectomy = 6(19.35%)
Number of patients where this is their second cancer = 13

Treatment of Prostate Cancer, Comparison of Comprehensive Community Cancer Centers in Great West region for 2001 with SJH 2001 and study range (1/1/04-9/30/04)			
Treatment type	2001 CCCC hospitals	2001 my hospital	My hospital 1/1/03 to 9/30/04
Surgery*	40%	59%	57%
Radiation*	41%	24%	22%
Surgery & radiation*	1%	1%	2%
Hormones	4%	6%	5%
Watchful waiting	9%	5%	13%
Other	5%	5%	1%

*with or without hormones

Conclusions: No specific recommendations could be drawn from this study except that even small volume of cancer at biopsy may result in a "significant" cancer by size criteria. It may be reasonable to re-biopsy patients with <1 mm in one core with a PSA <4.

Urology Committee review comments: Appreciate the study. Certainly reaffirms that as Urologists we are consistently doing the correct thing in our approach to prostate cancer. Fairly stringent criteria for the insignificant cancer - perhaps look at 0.2 cc rather than 0.5 cc with Gleason 7. Disagree with the need for 2nd biopsy.

References:

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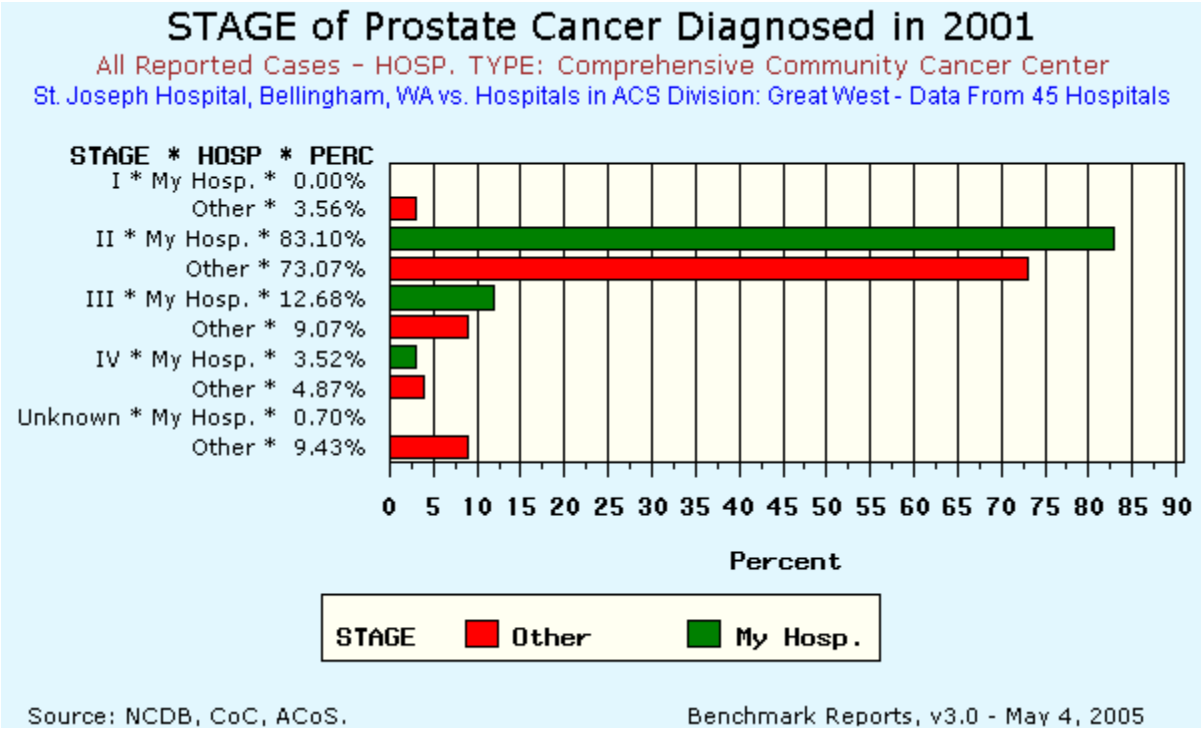
St. Joseph Hospital, Bellingham, WA vs. Hospitals in ACS Division: Great West - Data From 45 Hospitals

	N (cases)		% (percent)	
	Sum		Sum	
	Reported by		Reported by	
	Other	My Hosp.	Other	My Hosp.
TREATMENT				
Surgery Only	1,727	83	39.15	58.45
Radiation Only	1,078	22	24.44	15.49
Surgery & Radiation	26	0	0.59	0.00
Surgery, Radiation & Hormone Therapy	20	1	0.45	0.70
Radiation & Hormone Therapy	742	13	16.82	9.15
Surgery & Hormone Therapy	41	1	0.93	0.70
Hormone Therapy Only	156	8	3.54	5.63
Other Specified Treatment Combinations	216	7	4.90	4.93
No 1st Course Rx	405	7	9.18	4.93
Total	4,411	142	100.00	100.00

Source: NCDB, Commission on Cancer, ACoS. Benchmark Reports, v3.0



STAGE of Prostate Cancer Diagnosed in 2001

All Reported Cases - HOSP. TYPE: Comprehensive Community Cancer Center

St. Joseph Hospital, Bellingham, WA vs. Hospitals in ACS Division: Great West - Data From 45 Hospitals

	N (cases)		% (percent)	
	Sum		Sum	
	Reported by		Reported by	
	Other	My Hosp.	Other	My Hosp.
STAGE				
I	157	0	3.56	0.00
II	3,223	118	73.07	83.10
III	400	18	9.07	12.68
IV	215	5	4.87	3.52
Unknown	416	1	9.43	0.70
Total	4,411	142	100.00	100.00

Source: NCDB, Commission on Cancer, ACoS. Benchmark Reports, v3.0