



**Is Extended 11-Core Biopsy Valuable
In BPH Patients With Intermediate
Serum PSA (4.1 – 10 ng./ml.) And
Negative Prior Sextant Biopsy ?**

By

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Objective

**BPH
Patients**

- **Serum PSA : 4.1-10ng./ml.**
- **-ve sextant biopsy**

(A)

**To evaluate the impact of 11-
core biopsy on cancer
detection rate compared
to sextant biopsy**

(B)

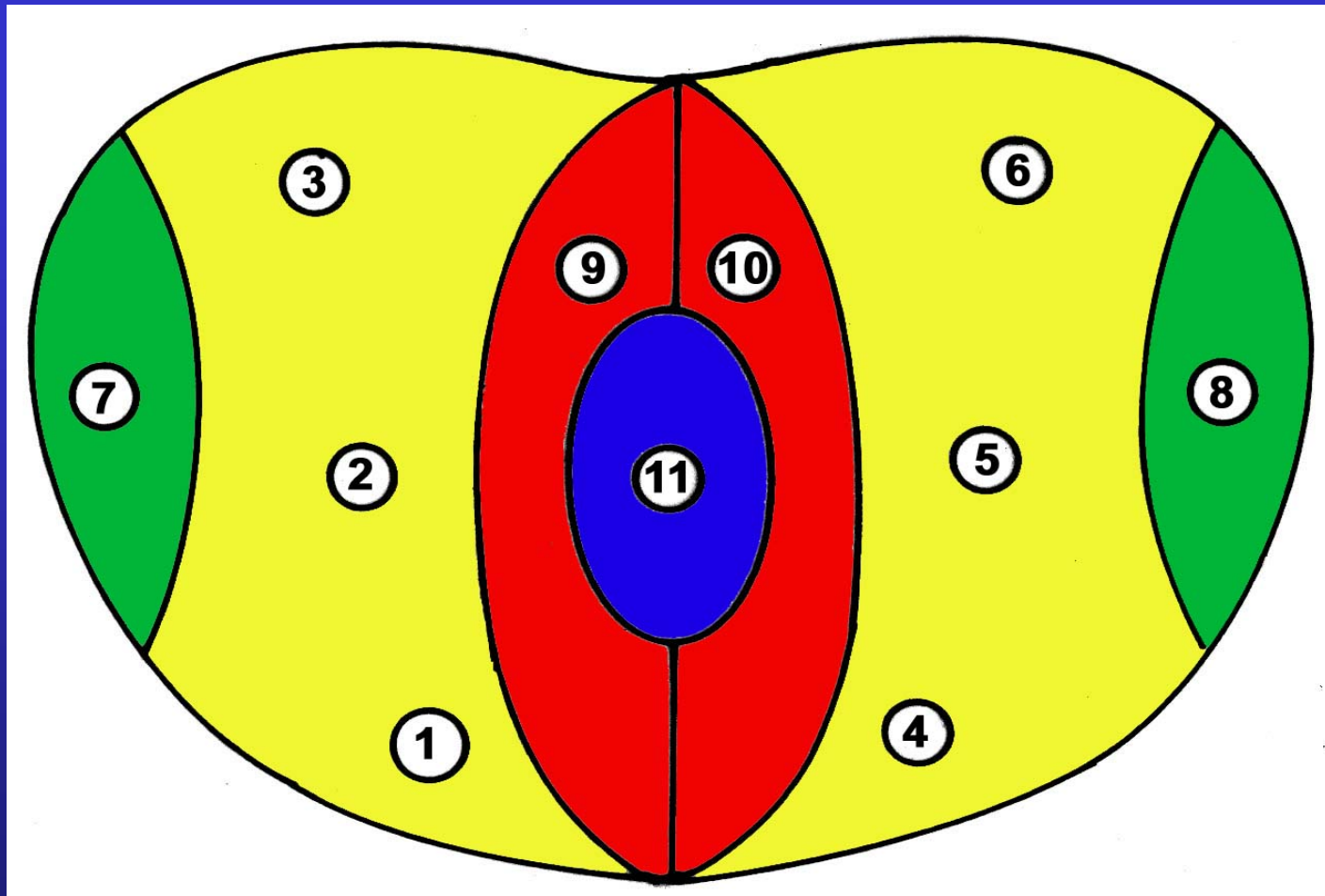
**To define a significant
predictor of cancer**

Indications of Repeat 11-Core Biopsy From 1999-2002 (n=381)

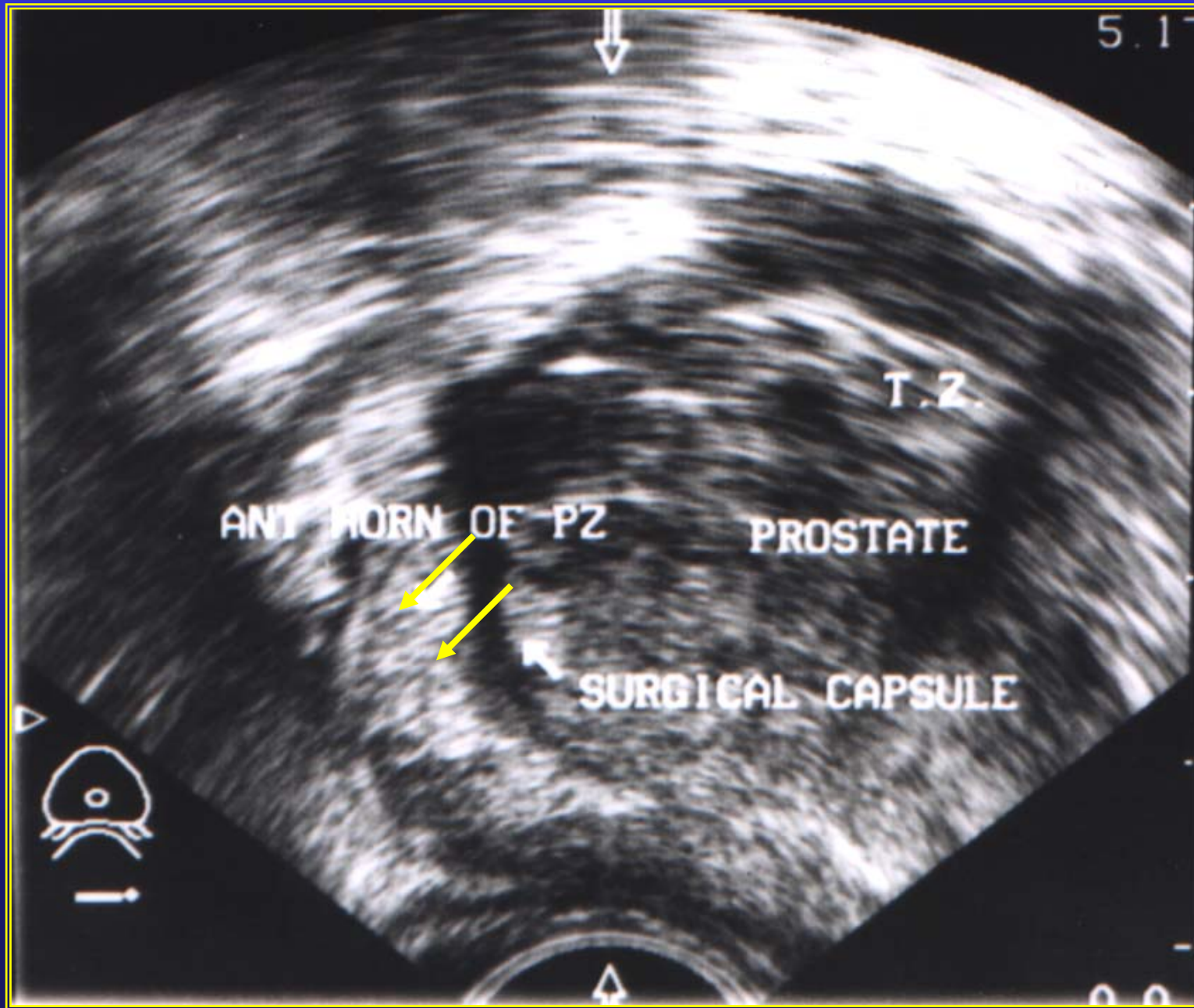
	No.	(%)
• PSA density ≥ 0.15	162	(42.5)
• PSA velocity ≥ 1 ng./ml./Y	123	(32.3)
• Abnormal DRE	71	(18.6)
• A-AH	26	(6.8)
• HGPIN	21	(5.5)

Baseline Patients Characteristics (n=381)

	Mean		SD
	value	±	
• Age (Years)	64.3	±	8.2
• Serum PSA (ng./ml.)	7.9	±	1.7
• Prostate volume (cc)	50.2	±	21.4
• Adenoma volume (cc)	26	±	15.8
• PSA density	0.16	±	0.05
• PSA/TZ index	0.33	±	0.14

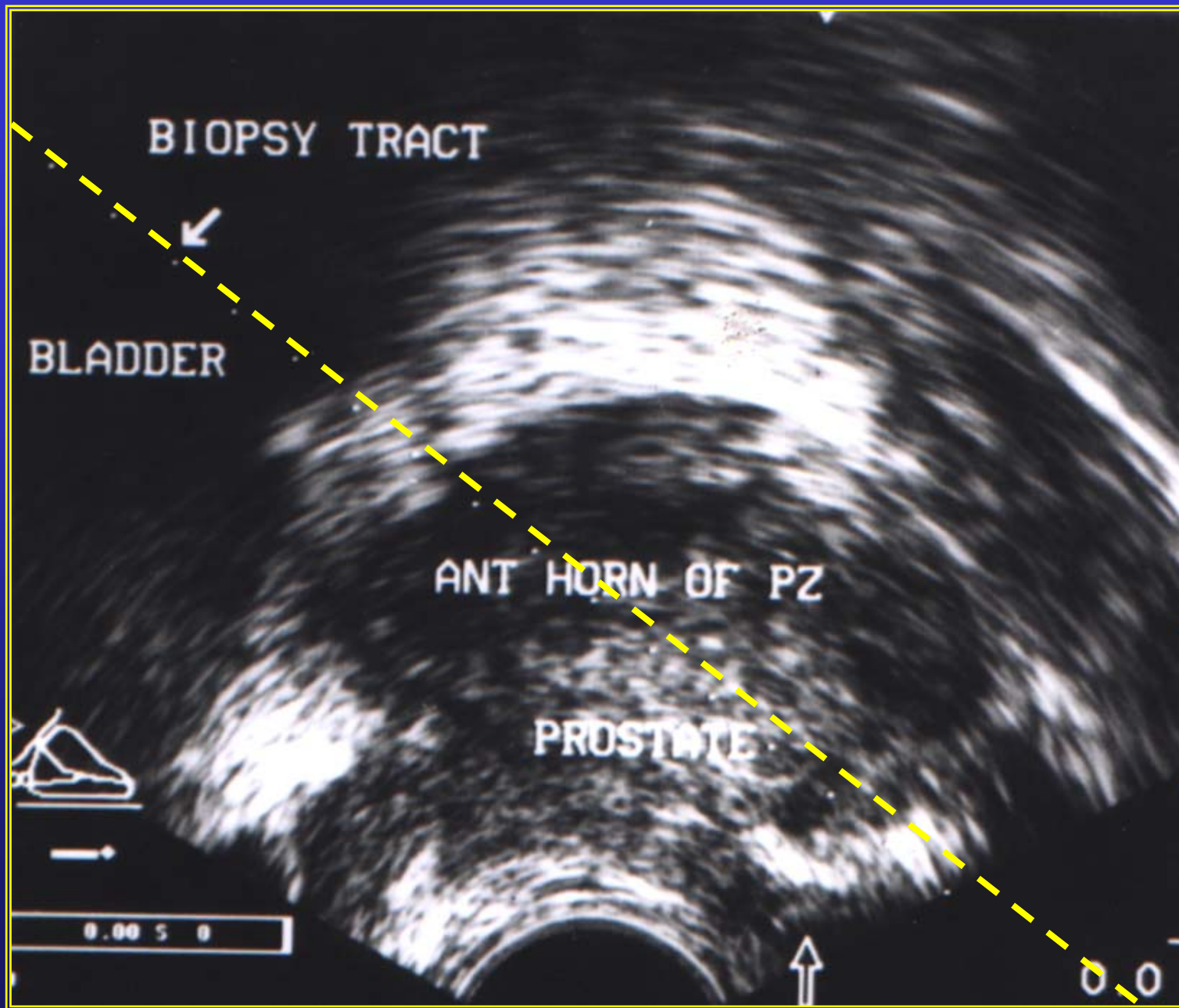


Scheme of extended 11-core biopsy strategy. Sextant biopsy sites (1-6), the Rt & Lt AH of the PZ (7, 8), the Rt & Lt TZ (9,10) and the midline site (11)



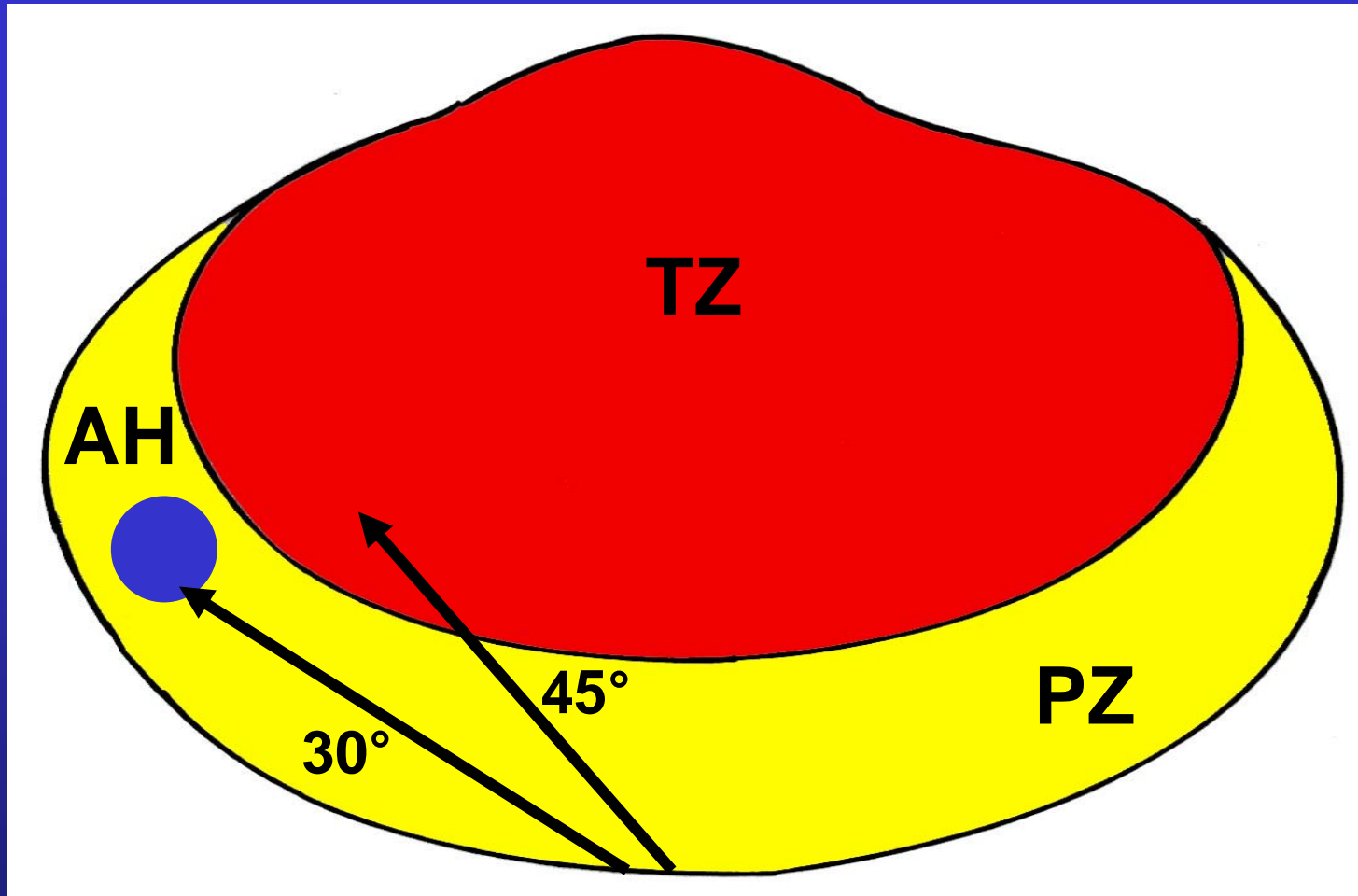
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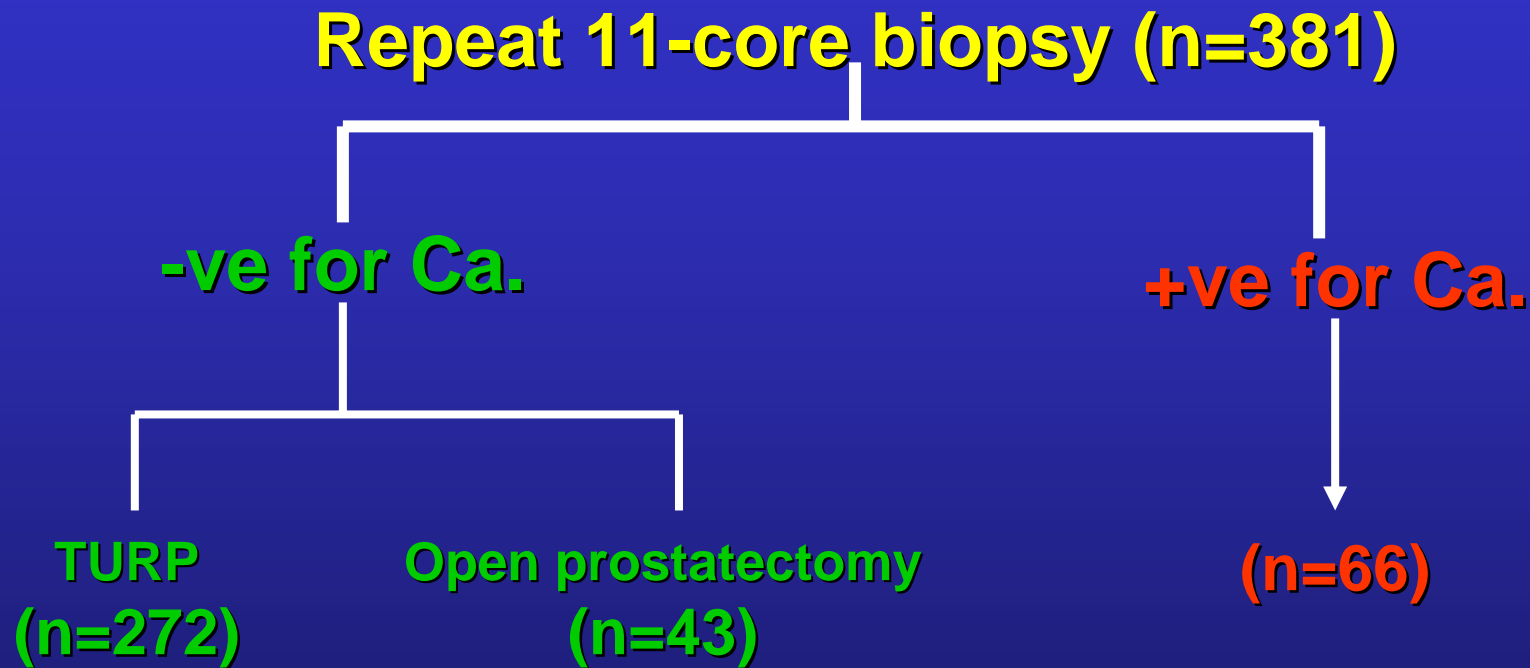
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Axial plane of the prostate demonstrates needle tracts in standard mid-lobar (45°) biopsy and lateral (30°) biopsy. Note that lateral biopsy actually samples more PZ tissue than midlobar biopsy which sample some TZ

Scheme of Study Design



- Results of definitive pathology were compared with results of repeat 11-core biopsy

Statistical Analysis

- 1) The Chi-square (χ^2) test with Fisher exact probability .
- 2) Stepwise logistic regression (with backward elimination using the likelihood ratio) to define independent predictors of cancer

Results of Repeat 11-Core Biopsy (n=381)

	No.	(%)
• BPH	169	(44.4)
• Chronic prostatitis	106	(27.8)
• A-AH	25	(6.6)
• HGPIN	15	(3.9)
• Prostatic carcinoma	66	(17.3)
• Total	381	(100)

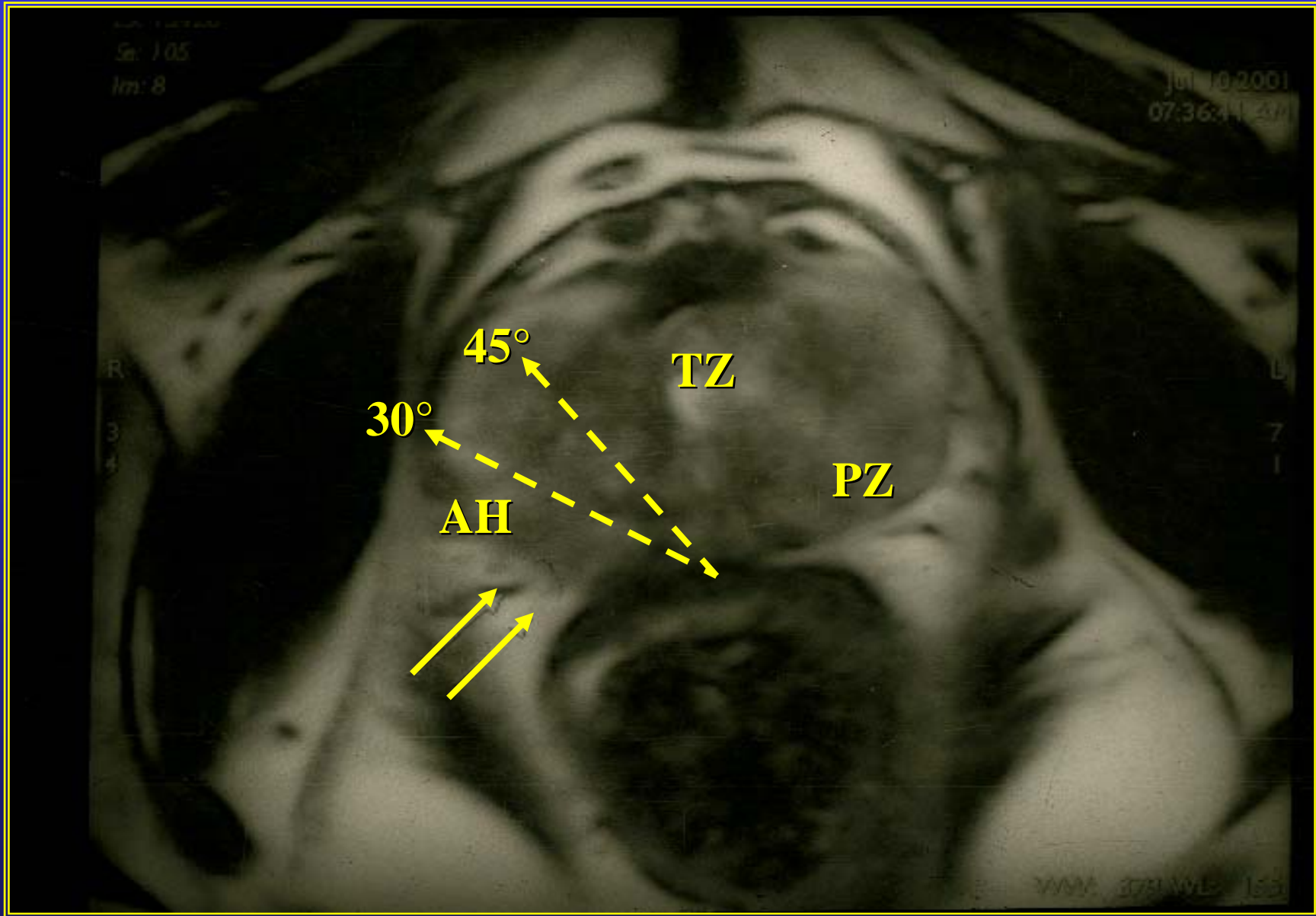
• Only 1-core was +ve in 41 of 66

62 %

Distribution of +ve Cores on Repeat Biopsy

	No.	(%)
• Sextant biopsy sites only	33/66	(50)
• Alternate sites only	21/66	(31.8)
• Sextant + alternate sites	12/66	(18.2)

- The anterior horn of the PZ was the most frequently +ve alternate site (25 of 33, 76%), followed by TZ (5 of 33, 15%), while midline site was involved in only 9% (3 of 33)



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Anatomical Distribution of +ve Cores on Repeat Biopsy

	No.	(%)
• PZ cancers only	[61/66]	(92.5)
• TZ cancers only	[3/66]	(4.5)
• PZ + TZ cancers	[2/66]	(3)

- The positive yield of TZ biopsy was low (5/66 = 7.6%). Pure TZ cancers were diagnosed in only 4.5% (3/66)

Cancer Detection Rate

	Sextant biopsy [/]*	11-core biopsy [/]*	Improve in detection rate [/]# (%)	P
• DRE				
BPH	20/310	38/310	18/38 (47.4)	0.009
Abnormal	25/71	28/71	3/28 (10.7)	0.364
• TRUS				
Isoechoic	17/213	32/213	15/32 (46.9)	0.016
Hypo. N. at TZ	4/105	8/105	4/8 (50)	0.187
Hypo. N. at PZ	24/63	26/63	2/26 (7.7)	0.428

[/]* : [cancer detected cases/total No. of patients]

[/]# : [No. increase in cancer detection/total No. of cancer cases]

Cancer Detection Rate

	Sextant biopsy [/]*	11-core biopsy [/]*	Improve in detection rate [/]# (%)	P
PSAD				
≤ 0.12	2/69	3/69	1/3 (33.3)	0.500
0.13-0.14	19/150	24/150	5/24 (20.8)	0.255
≥ 0.15	24/162	39/162	15/39 (38.5)	0.024
PSAV				
≥ 1ng./ml./Y	16/123	28/123	12/28 (42.8)	0.033

[/]* : [cancer detected cases/total No. of patients]

[/]# : [No. increase in cancer detection/total No. of cancer cases]

Cancer Detection Rate

	Sextant biopsy [/]*	11-core biopsy [/]*	Improve in detection rate [/]# (%)	P-value
• Prostate volume				
< 30 cc	7/33	7/33	0/7 (0)	0.618
30-50 cc	19/156	30/156	13/33 (40.6)	0.033
> 50 cc	19/192	29/192	8/27 (26)	0.136
• Overall	45/381	66/381	21/66 (31.8)	0.019

[/]* : [cancer detected cases/total No. of patients]

[/]# : [No. increase in cancer detection/total No. of cancer cases]

Results of Definitive Pathology (n=315)

	No.	(%)
• BPH	166	(52.7)
• Chronic prostatitis	106	(33.7)
• A-AH	24	(7.6)
• High grade PIN	13	(4.1)
• Prostatic carcinoma	6	(1.9)
• Total	315	(100%)

- The repeat biopsies of the 6 cancer cases were high grade PIN in 2, A-AH in 1 and BPH in 3

Sensitivity & -ve Predictive Value

	Sextant biopsy	11-core biopsy	P
• Sensitivity	62.5%	91.7%	<0.001
• -ve PV	91.6%	98.1%	<0.001

• Sextant biopsy missed **37.5% (27 of 72)**, while 11-core biopsy missed only **8.3% (6 of 72)** of the cancers, (**P < 0.001**)

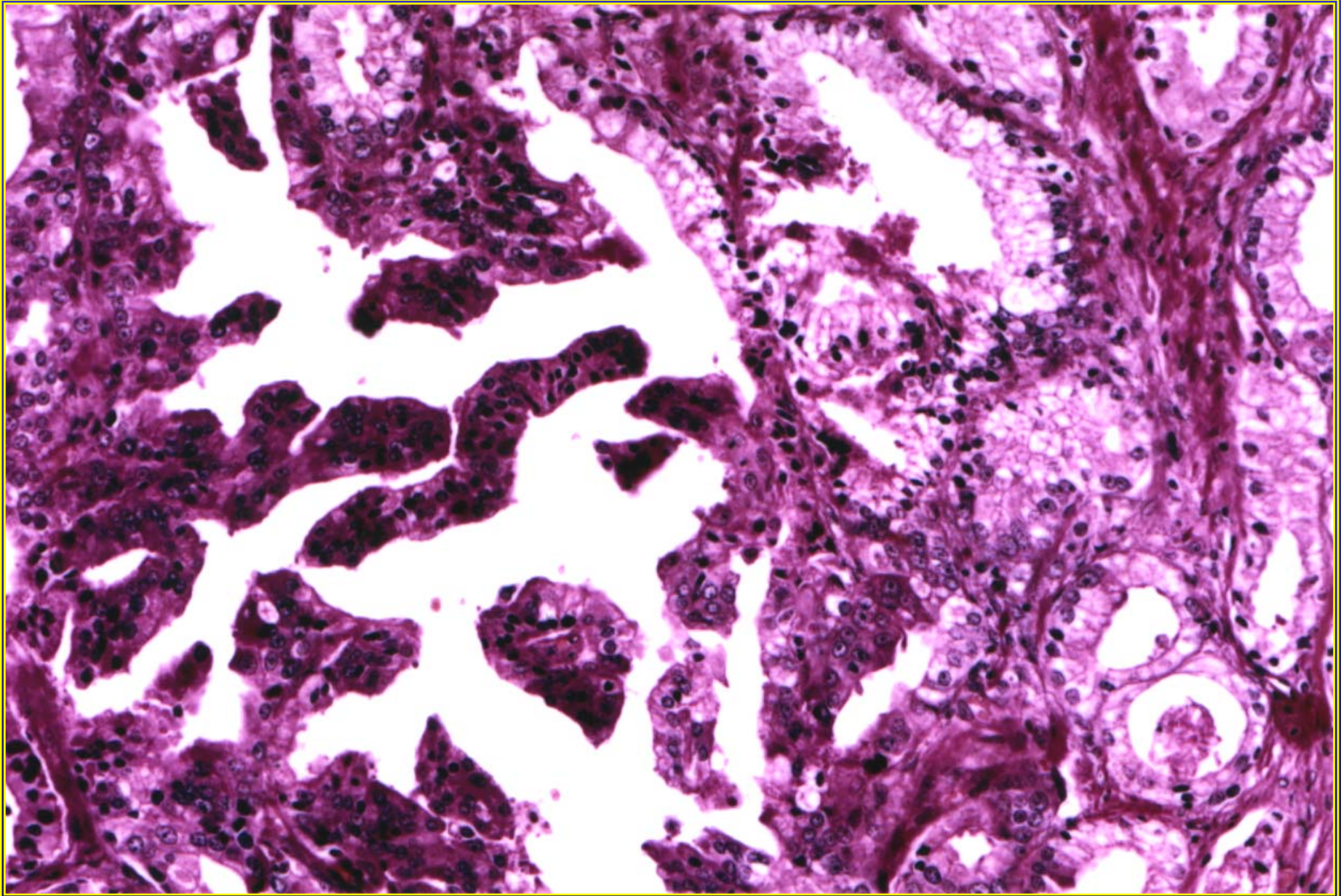
Cancer Detection Rate HGPIN & A-AH

	HGPIN		A-AH		P
	[/]*	(%)	[/]*	(%)	
• 11-core biopsy	[8/21]	(38)	[4/26]	(15.4)	0.075
• Def. pathology	[2/15]	(13.3)	[1/25]	(4)	0.641
• Overall	[10/23]	(43)	[5/29]	(17.2)	0.038

[/]*: [No. of cancer detected cases/total No.]

* In cases of HGPIN and A-AH, 11-core technique improved detection rate by only **25%** (**P was not significant**)

* Cancer were detected at the sextant sites in **75%**



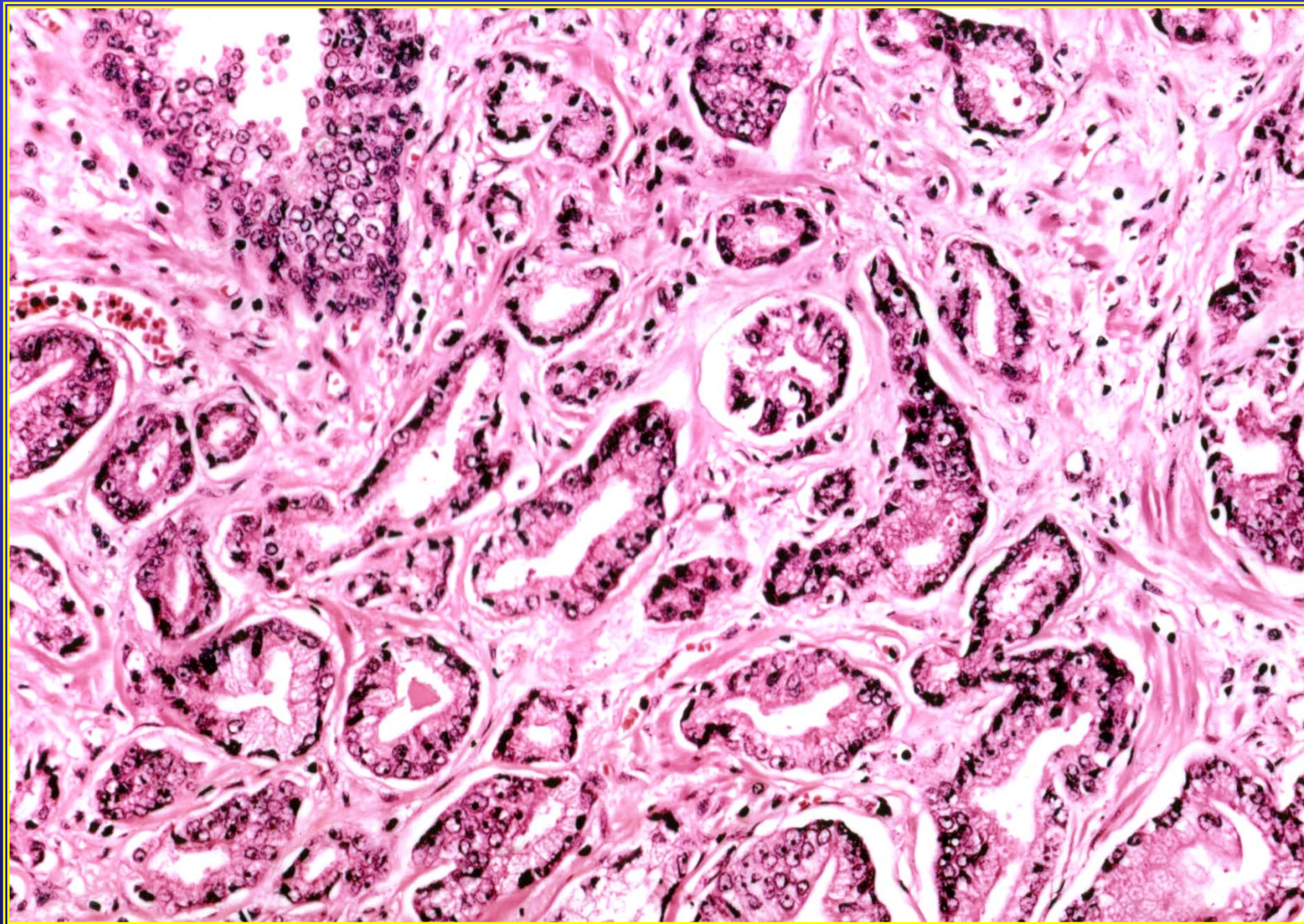
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Gleason Score

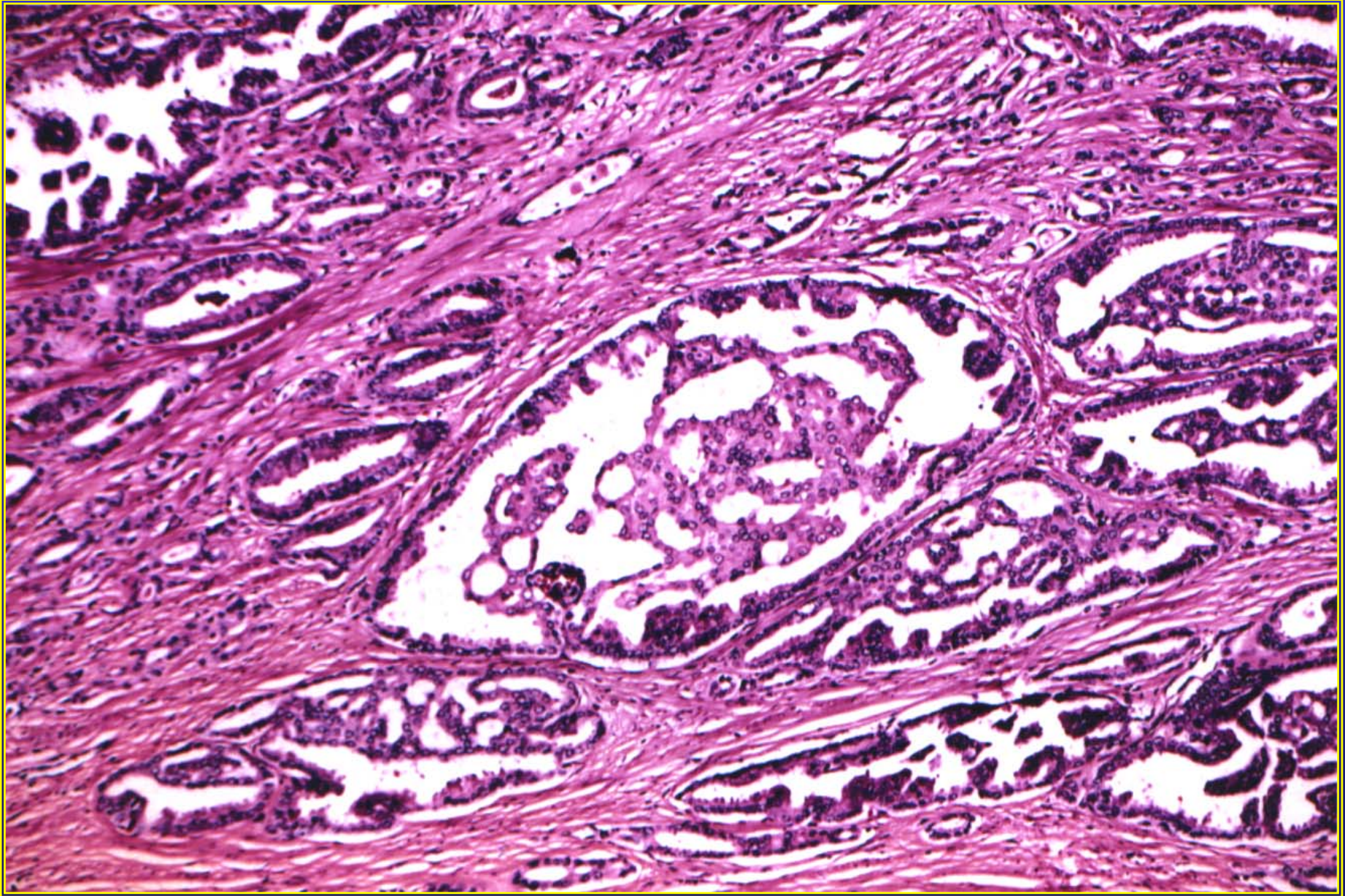
	Sextant		11-core		P
	No.	(%)	No.	(%)	
• Gs < 5	21	(46.7)	34	(51.5)	0.378
• GS = 5-7	21	(46.7)	29	(44)	0.684
• GS > 7	3	(6.6)	3	(4.5)	0.417
• Total	45	(100)	66	(100)	
• Mean GS	5.3 ± 1.4		4.8 ± 1.4		0.139

* Of the 6 cancer cases detected on definitive pathology, 3 (50%) were of low GS, 3 (50%) were of moderate GS



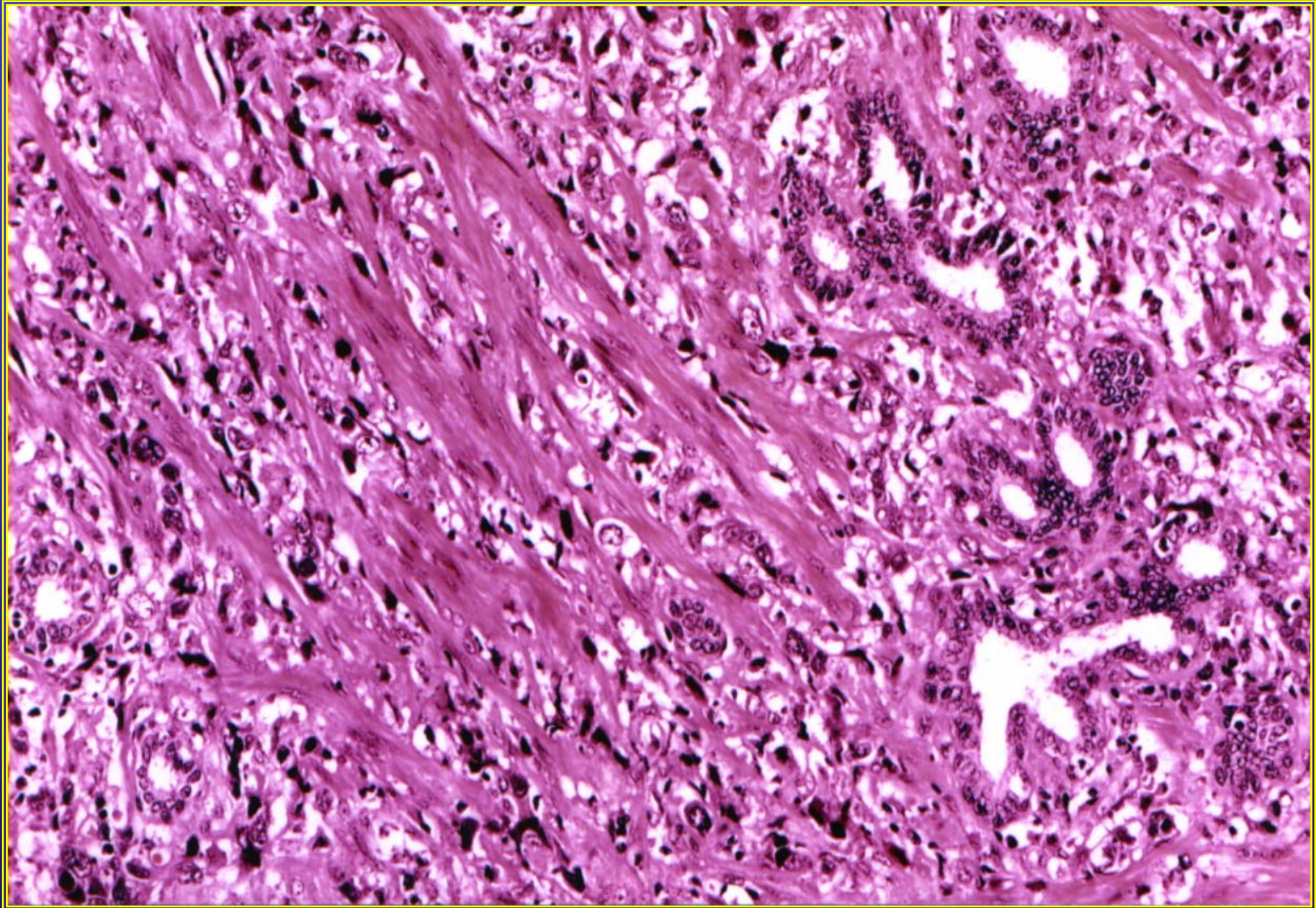
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Multivariate Analysis : Risk Factors

- (1) Age .
- (2) Serum PSA.
- (3) DRE .
- (4) TRUS findings .
- (5) PSA density .
- (6) PSA velocity .
- (7) PSA/TZ index.

Stepwise Logistic Regression

Evaluation of risk factors as a predictors of cancer when data was inserted as continuous format

Risk factors	(B)	(P-value)
• PSA density	32.0198	0.011
• PSA velocity	2.2520	0.002
• Age	0.2458	0.021
• DRE		
– Benign felling	0.00	0.149
– Firm prostate	-3.8405	0.052
– Suspicious nodule	-2.2799	0.673
• Constant	-27.6110	0.005

* Overall accuracy = 95.9%

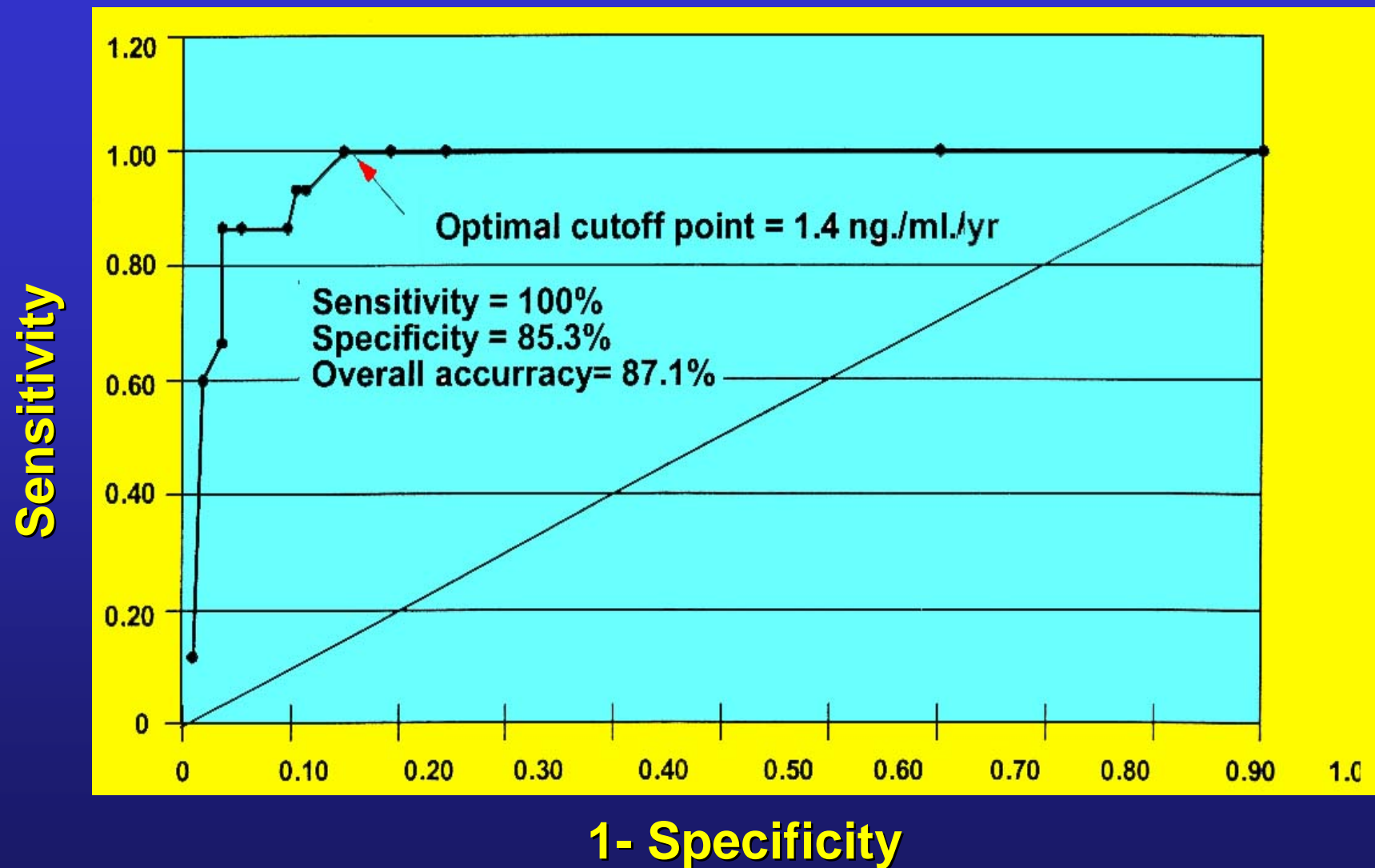
* Other risk factors were removed from the model

Stepwise Logistic Regression

- PSA velocity and PSA density were the most relevant predictors of cancer (when data was inserted as coded format). **Significance of Log LR= < 0.001, and = 0.031**, respectively, if term was removed.

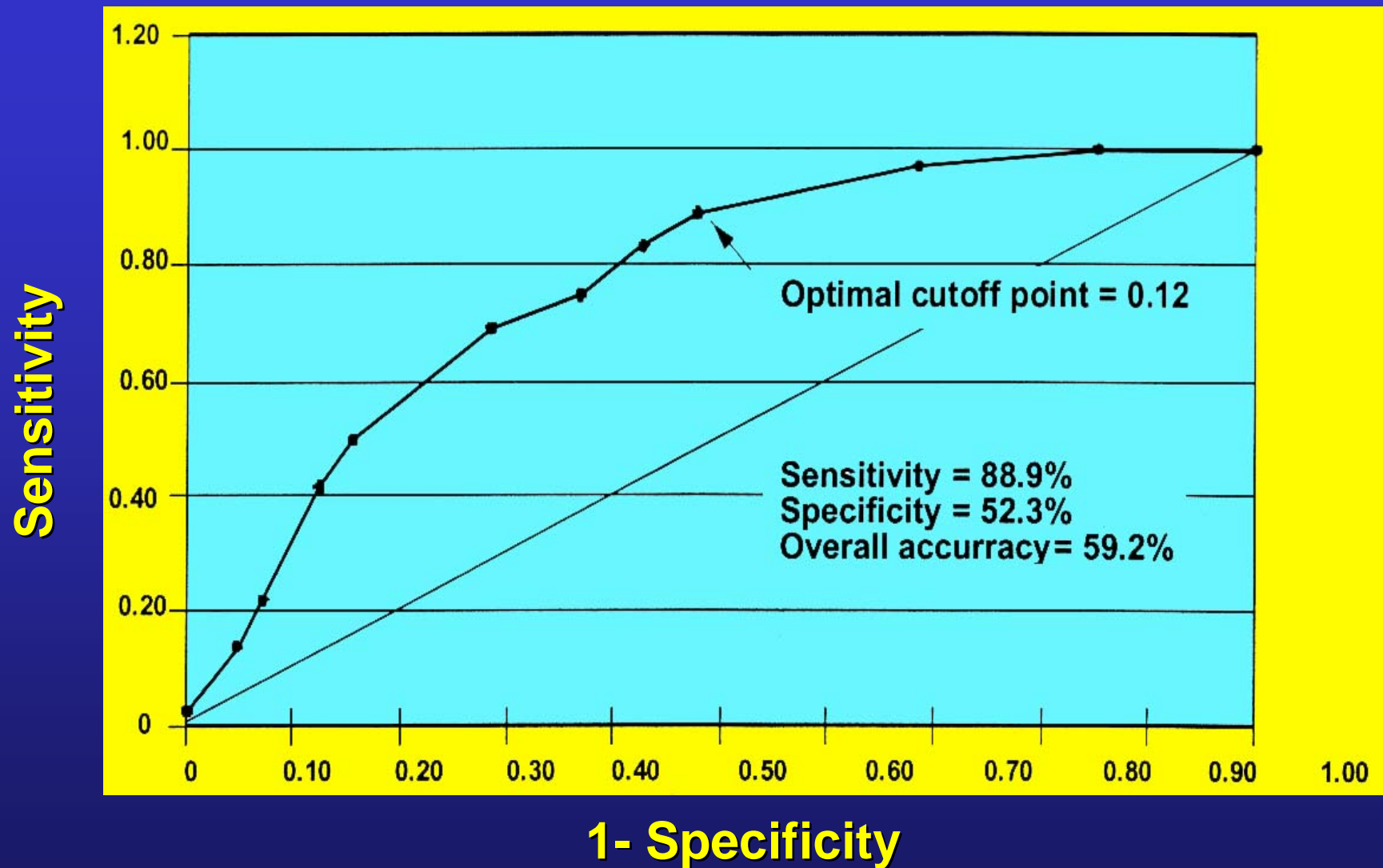
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- **Overall accuracy 91.7%**
 - **Other risk factors were removed from the model .**

Area under ROC Curve = 0.9599



ROC curve for PSA velocity shows sensitivity graphed against 1-specificity . Arrow indicates optimal cutoff point

Area under ROC Curve = 0.7625



ROC curve for PSA density shows sensitivity graphed against 1-specificity . Arrow indicates optimal cutoff point

Conclusion I

- **Extended 11-core biopsy protocol is valuable for BPH patients with intermediate PSA and prior –ve sextant biopsy as a 32% increase in overall cancer detection rate was observed when alternate sites were sampled ($P = 0.019$).**

Conclusion II

- 11-core technique significantly had better detection rate compared to standard sextant biopsy when DRE is normal ($P = 0.009$), the prostate is isoechoic on TRUS ($P = 0.016$) and the gland volume in the range of 30-50 cc ($P = 0.033$) .

Conclusion III

- Extended biopsy scheme is useful in patients with PSA density ≥ 0.15 and in patients with PSA velocity ≥ 1 ng./ml./ year as it enhanced detection rate by **38.5% (P = 0.024)** and by **42.8% (P = 0.033)**, respectively.

Conclusion IV

- TZ biopsy is of limited value in such group of patients as it increased overall detection rate by only **4.5% (3/66)**. Pure TZ cancers are uncommon (**9/381 = 2.3%**) .

Conclusion V

- PSA velocity ($P = 0.002$) and PSA density ($P = 0.011$) were the most significant predictors of cancer using logistic regression model when data was inserted as continuous format. They were the only predictors when data was inserted as coded format.

Thank You

