(prostate specific antigen, PSA) PSA 가 PSA :1993 1998 20 50Gy 14 20Gy 63 70Gy 13 66 26 PSA 3.0ng/ml PSA 0.6 $2.1(\pm 0.9)$ 1.9 . 20 19 (95%) PSA 가 12 5.0 가 10ng/ml $5.3(\pm 2.7)$ PSA 2 가 , 10ng/ml PSA 가 . PSA 0.6 ng/ml**PSA** 1.8ng/ml **PSA** (nadir PSA) 0.2 $0.8(\pm 0.5)$ ng/ml, $\begin{array}{c}
 13.5(\pm 4.3) \\
 6 & 20
\end{array}$, 14.0 6 가 2 가 가 PSA PSA 12 (PSA), PSA PSA 1999;17(2):136 140 .2 7) PSA 가 , PSA 2 3 .3,8) 1998 7 1) PSA .2,3,9,10) PSA PSA .6)

1993

1998

5

(01-1993-176-0)

1999 4 15

1999 2 24

가

가

(prostate specific antigen, PSA) glycoproteinserine protease

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,

Table 1. Patient Characteristics

Characteristics		No. of patients	
Age		48 78yr (median; 68yr)	
Stage			
A		4	
В		12	
C		4	
Gleason's score			
2	4	8	
5	7	11	
8	10	1	
Initial PSA (ng/ml)*			
3	10	8	
10	20	6	
20	30	3	
30	40	3	

*normal PSA; below 3 ng/ml

PSA (immunoradiometric assay) ELSA-PSA2 kit , 3.0ng/ml

.

 1 4 , 6 6 12 66 , 26 .

. PSA 12 19 (95%) PSA 가 가 $5.3(\pm 2.7)$ 5.0 . PSA 19 2 17 (89%), 12 , 8 19 (100%) PSA 가 **PSA** 10ng/ml **PSA** 19 PSA . 23 **PSA** 가 , 25 29 가 45 . 19 가 **PSA** 가 27 40 53 . PSA 가 가 14 PSA 30

. PSA

,

PSA

Table 2. Half-life of PSA after Radiotherapy

Author	Time of evaluation	Mean	Median
Meek et al	during RT	93 days	50 days
	after RT	126 days	116 days
Ritter et al	during and	2.6	2.6
	after RT	months	months
Vijayakumaretal.	during RT		
<i>.</i> .	during and	83.1 days	58.5 days
Current study	after RT	-	-
•		2.1	1.9
		months	months

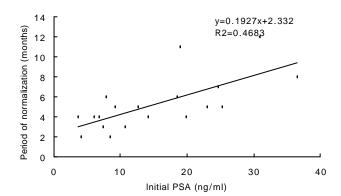


Fig.1.The relationship between initial PSA and period of PSA normalization in nineteen patients given radical radiotherapy. One excluded patient was not reached normal PSA level (<3.0 ng/ml), and diagnosed as local recurrence at 30 months. There was positive correlation between initial PSA and period of PSA normalization (R2=0.1753).

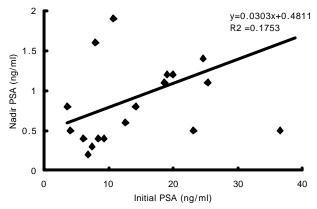


Fig.2.The relationship between initial PSA and nadir PSA in nineteen nonfailing patients.

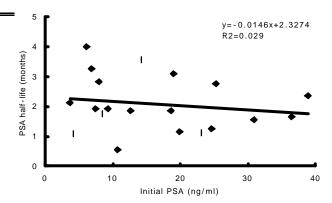
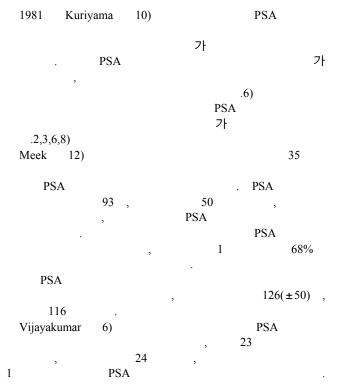


Fig.3.The relationship between initial PSA and PSA half life in twenty patients given radical radiotherapy. There was no definite correlation between initial PSA and PSA half life (R2=0.029).



1	PSA	
가		, 가
,		가,
,	DNA	PSA
가 10	. PSA	가
19	83.1 ,	PSA 58.5
1.56%		
Ritter 5)		32
PSA 1.5	50%	PSA
가	, 18	90%
PSA 가 2.6(±1.3) ,	. PSA 2.6 ,	
$2.0(\pm 1.3)$, $2.1(\pm 0.9)$,	1.9	
		PSA
		PSA
,		rsA
	PSA	$1.1(\pm 1.1) \text{ng/ml},$
0.9ng/ml , 0.6ng/ml	0.8	$8(\pm 0.5)$ ng/ml,
0.011g/1111	PSA	
	,	,
, 1 , 3		,
PS.	A	,
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PSA		,
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12	PSA 7	r 가
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		. PSA
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PSA		
		,
	PSA	. Critz
		. CIIIZ

0.5ng/ml

13)

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Pattern of Decrease of Prostate Specific Antigen after Radical Radiotherapy for the Prostate Cancer

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<u>Purpose</u>:Prostate specific antigen (PSA) is a useful tumor marker, which is widely used as a diagnostic index and predictor of both treatment and follow-up result in prostate cancer. A prospective analysis was carried out to obtain the period of PSA normalization and the half life of PSA and to analyze the factors influencing the period of PSA normalization. The PSA level was checked before and serially after radical radiotherapy.

Materials and Methods: Twenty patients with clinically localized prostate cancer who underwent radical external beam radiotherapy were enrolled in this study. Accrual period was from April 1993 to May 1998. Median follow-up period was 26 months. Radiotherapy was given to whole pelvis followed by a boost to prostate. Dose range for the whole pelvis was from 45 Gy to 50 Gy and boost dose to prostate, from 14 Gy to 20 Gy. The post-irradiation PSA normal value was under 3.0 ng/ml. The physical examination and serum PSA level evaluation were performed at 3 month interval in the first one year, and then at every 4 to 6 months.

Results: PSA value was normalized in nineteen patients (95%) within 12 months. The mean period of PSA normalization was $5.3 \ (\pm 2.7)$ months. The half life of PSA of the nonfailing patients was $2.1 \ (\pm 0.9)$ month. The nadir PSA level of the nonfailing patients was $0.8 \ (\pm 0.5)$ ng/ml. The period of PSA normalization had the positive correlation with pretreatment PSA level (R2=0.468). The nadir PSA level had no definite positive correlation with the pretreatment PSA level (R2=0.175). The half life of serum PSA level also had no definite correlation with pretreatment PSA level (R2=0.029).

Conclusion: The PSA level was mostly normalized within 8 months (85%). If it has not normalized within 12 months, we should consider the residual disease in prostate or distant metastasis. In 2 patients, the PSA level increased 6 months or 20 months before clinical disease was detected. So the serum PSA level can be used as early diagnostic indicator of treatment failure.

Key Words: Prostate cancer, Radical radiotherapy, Prostate specific antigen (PSA), PSA half life, Nadir PSA level