RESULTS

This study enrolled 56 male patients with elevated P.S.A with clinically prostate cancer diagnosed by 18-gauge transrectal core needle biopsy selected from Benha University Hospital, Kasr Alainy University Hospital and other centers in the period from May 2008 to April 2010.

Pathological examination of both biopsies and radical prostatectomy specimens was done.

Pathological evaluation of biopsy included, Gleason Score, lateral location, number of positive cores and the amount of cancer within each positive core.

Radical prostatectomy specimens pathological examination evaluating Gleason Score, laterality, surgical margins, seminal vesicles and lymph node invasion.

In an attempt to evaluate the accuracy of preoperative Gleason score in predicting pathological grading and tumor distribution compare to the pathological grading of the post radical prostatectomy specimen.

The statistical analysis was done and we found that:

1- Characteristics features of study group:

- The age of the patients in this study ranged from 55 years to 78 years, with the mean age 62.04 years.
- The PSA of the patients in this study ranged from 4.5 ng/ml to 44 ng/ml with the mean PSA 13.68 ng/ml.
- Needle biopsy Gleason score ranged from 4-7 with the mean Gleason score 6.32. While postradical prostatectomy specimens Gleason score ranged from 5-8 with the mean Gleason score 6.5.

Table (11): Characteristics features of study group:

	N	Minimum	Maximum	Mean	Std. Deviation
Age	56	55	78	62.04	5.364
PSA	56	4.5	44.0	13.682	10.5269
Gleason Score in biopsy	56	4	7	6.32	0.945
G.S in R.P. specimen	56	5	8	6.50	0.882

2-Distribution of biopsies in 56 prostate cancer patients who underwent radical prostatectomy:

-The number of biopsies ranged from 6 to 30, with the majority of patients 48 (85.7%) having 6 biopsies.

Table (12): Distribution of biopsies in 56 prostate cancer patients who underwent radical prostatectomy:

		No	*%*
No of Biopsies	6	48	85.7
	12	2	3.6
	24	4	7.1
	30	2	3.6
	Total	56	100.0

3-Distribution of positive cores in biopsies:

- The number of positive cores (biopsy sites) ranged from 1 to 6, with the majority 20 cases (35.7 %) having sex positive biopsy sites.
- While 14 cases having 4 positive biopsy sites (25%), and also 14 cases having 2 positive biopsy sites (25%).
- While 4 cases having 1 and 3 positive biopsy sites (7.1%).

Table (13): Distribution of positive cores in biopsies in 56 prostate cancer patients who underwent radical prostatectomy:

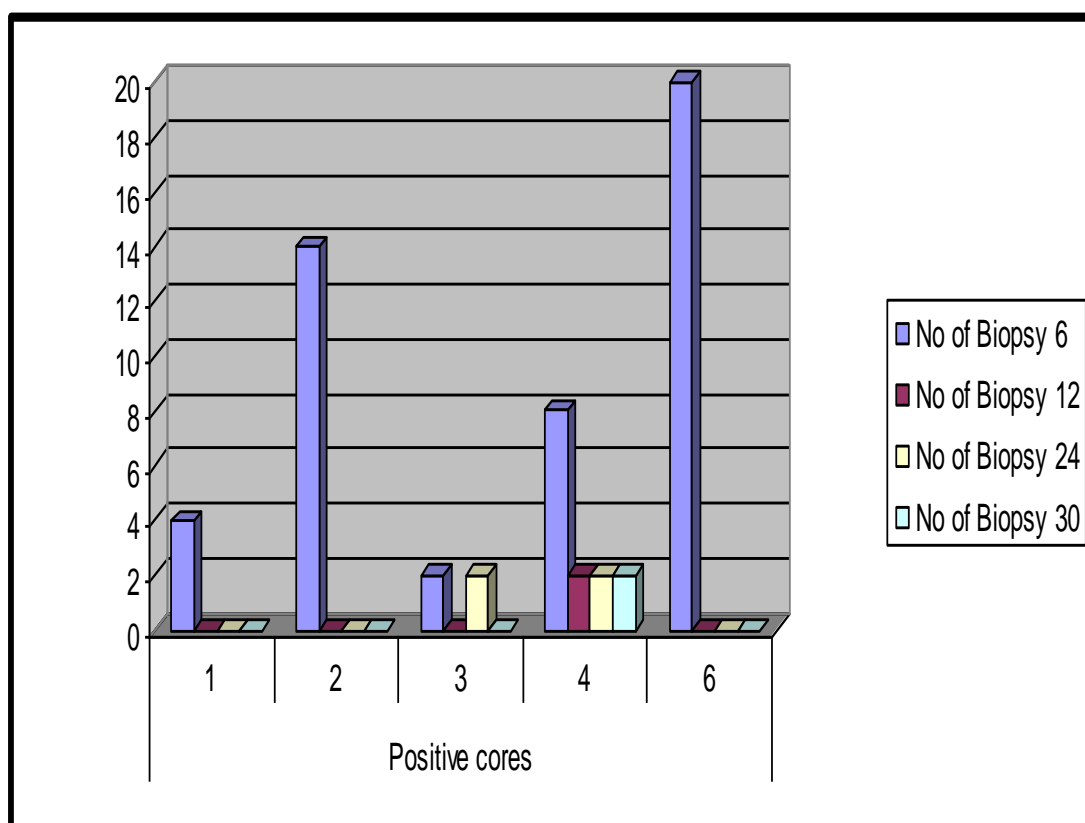|		*Positive cores*					
		1	2	3	4	6	Total
No of Biopsy	6	4	14	2	8	20	48
	12	0	0	0	2	0	2
	24	0	0	2	2	0	4
	30	0	0	0	2	0	2
	Total	4(7.1%)	14(25%)	4(7.1%)	14(25%)	20(35.7%)	56

Fig (30): Distribution of positive cores in biopsies in 56 prostate cancer patients who underwent radical prostatectomy.

4-Laterality in needle biopsy:

   - Of the 56 patients, 20 (35.7%) had unilateral disease, and 36 (64.3%) had bilateral disease on biopsy.

Table (14): Laterality in needle biopsy:

		No	*%*
Biopsy Laterality	Bilateral	36	64.3
	Unilateral	20	35.7
	Total	56	100.0

5-PSA stratification on laterality of the disease:

-We classified our patients into two groups according to PSA:

- Group (I): PSA < 10 ng/ml.

- Group (II): PSA > 10 ng/ml.

In addition, we correlate the PSA and laterality of the disease

- Shown that in PSA < 10 ng/ml, 16 patients (50%) had unilateral disease   and 16 patients (50%) had bilateral disease.

- While in patients with PSA > 10 ng/ml, 4 patients (16.7%) had unilateral disease and 20 patients (83.3%) had bilateral disease

Table (15): PSA stratification on disease laterality:

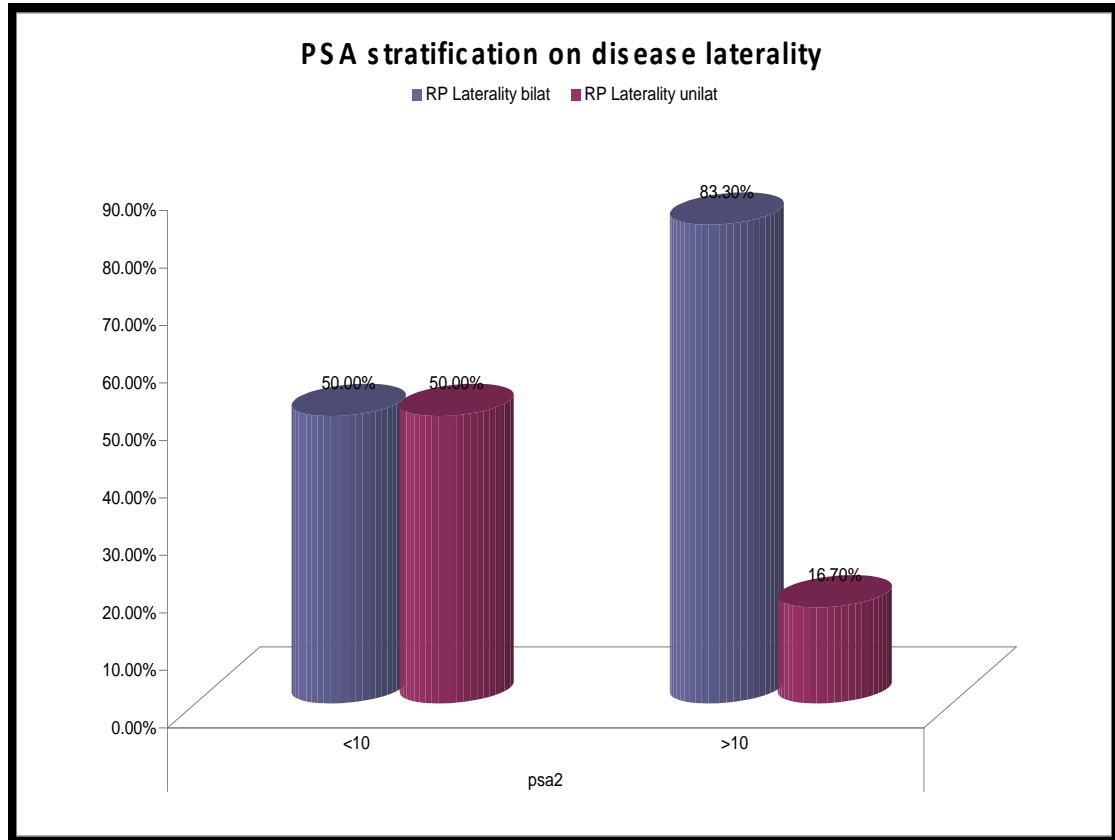|		PSA						X^2	p
		<10		>10		Total			
		no	%	no	%	no	%		
RP Laterality	Bilateral	16	50.0%	20	83.3%	36	64.3%	2.03	>0.05
	Unilateral	16	50.0%	4	16.7%	20	35.7%		
	Total	32	100.0%	24	100.0%	56	100.0%		

Fig (31): PSA stratification on disease laterality.

6-Preoperative staging:

- Of 56 patients, there were 20 patients (35.7%) had T2a staging and 36 patients (64.3%) had T2b staging according to T.N.M classification (2002).

Table (16): Preoperative Staging:

		No	*%*
Preoperative Staging	**T2a**	20	35.7
	T2b	36	64.3
	Total	56	100.0

7-Pathological pattern of needle biopsies (Gleason score and Gleason pattern):

-In 56 patients with prostate cancer, needle biopsy findings were:

- Gleason score ranged from 4-7.
- Gleason score 4, 4 patients (7.1 %), their Gleason pattern was 2+2.
- Gleason score 5, 6 patients (7.1 %), their Gleason pattern was 3+2.
- Gleason score 6, 14 patients (25 %), their Gleason pattern was 3+3.
- Gleason score 7, 32 patients (57.1 %), their Gleason pattern was 22 patients (39.3%) 3+4, and 10 patients (17.9%), their Gleason pattern was 4+3.

Table (17): Gleason Score & Gleason Pattern of needle biopsies:

		No	*%*
Biopsy Gleason Score	4	4	7.1
	5	6	10.7
	6	14	25.0
	7	32	57.1
	Total	**56**	**100.0**
Biopsy Gleason Pattern	2+2	4	7.1
	3+2	6	10.7
	3+3	14	25.0
	3+4	22	39.3
	4+3	10	17.9
	Total	**56**	**100.0**

8-Pathological pattern of Radical Prostatectomy specimen (Gleason score and Gleason pattern):

-In 56 patients with prostate cancer, Radical Prostatectomy specimen findings were:

- Gleason score ranged from 5-8.
- Gleason score 5, 10 patients (17.9 %), their Gleason pattern was 3+2.
- Gleason score 6, 12 patients (21.4 %), their Gleason pattern was 3+3.
- Gleason score 7, 30 patients (53.6 %), their Gleason pattern was 3+4 in 14 patients (25%) and (4+3) in 16 patients (28.6%).
- Gleason score 8, 4 patients (7.1 %), their Gleason pattern was 4+4.

Table (18): Gleason Score & Gleason Pattern of Radical prostatectomy specimen:

		No	*%*
RP G.S	5	10	17.9
	6	12	21.4
	7	30	53.6
	8	4	7.1
	Total	**56**	**100.0**
RP G.P	3+2	10	17.9
	3+3	12	21.4
	3+4	14	25.0
	4+3	16	28.6
	4+4	4	7.1
	Total	**56**	**100.0**

9-Pathological features of radical prostatectomy specimen:

- Of 56 patients underwent radical prostatectomy:

- There were 36 patients (64.3%) had bilateral disease, and 20 Patients (35.7%) had unilateral disease.

- There were 6 patients had surgical margin invasion (10.7%).

- There were 14 patients had extracapsular extension (25%).

-There were 12 patients had seminal vesicle invasion (21.4%).

- There were 18 patients had lymph node involvement (32.1%), 14 patients of them had bilateral lymph node invasion (25%) ,and 4 patients had unilateral lymph node invasion.

Table (19): Pathological Features of radical prostatectomy specimen:

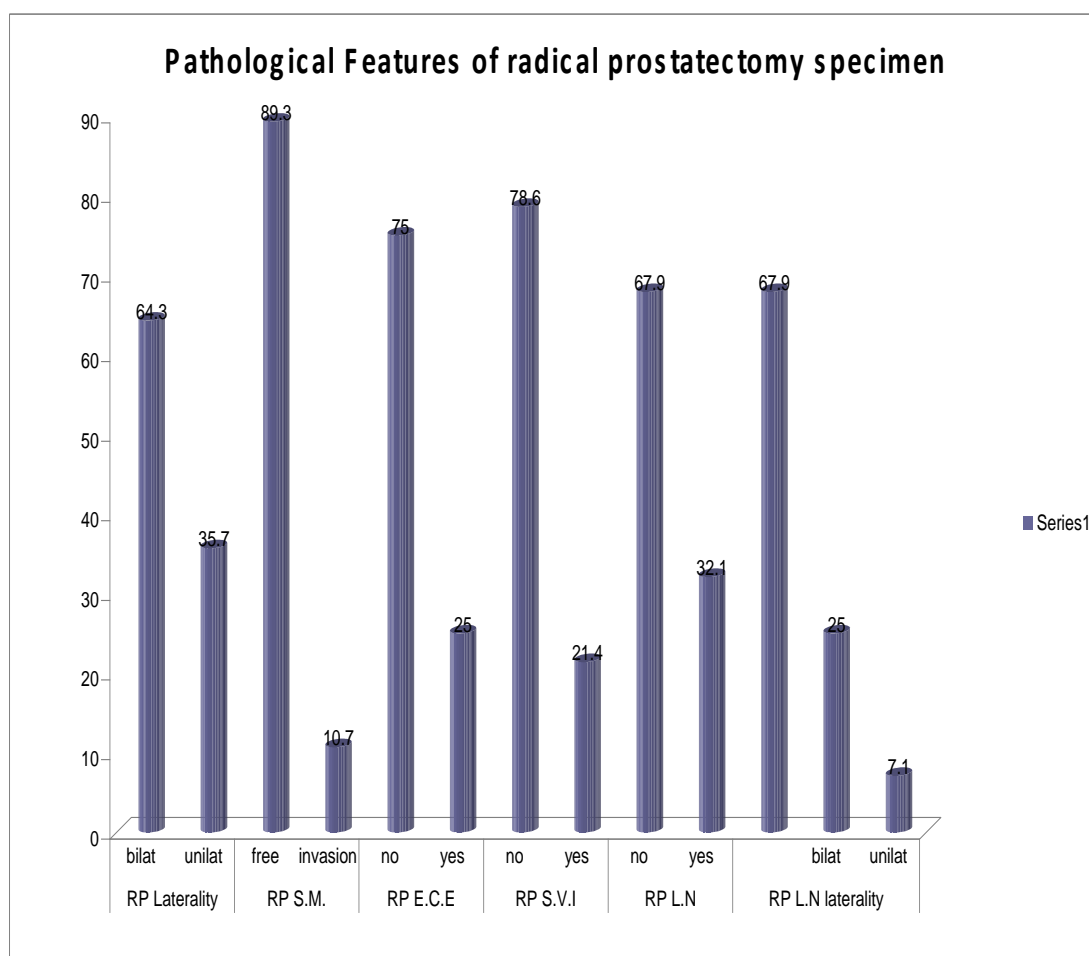|		*No*	*%*
RP Laterality	bilateral	36	64.3
	unilateral	20	35.7
	Total	56	100.0
RP S.M.	free	50	89.3
	invasion	6	10.7
	Total	56	100.0
RP E.C.E	no	42	75.0
	yes	14	25.0
	Total	56	100.0
RP S.V.I	no	44	78.6
	yes	12	21.4
	Total	56	100.0
RP L.N	no	38	67.9
	yes	18	32.1
	Total	56	100.0
RP L.N laterality		38	67.9
	bilateral	14	25.0
	unilateral	4	7.1
	Total	56	100.0

Fig (32): Pathological Features of radical prostatectomy specimen.

10- Post radical prostatectomy staging:

According to T.N.M   classification (2002) there were:

- 18 patients had T2a (32.1%).

- 20 patients had T2b (35.7%).

- 2 patient had T3a   (3.6%).

- 6 patients had T3b (10.7%).

- 6 patients had T3c (10.7%).

- 4 patients had T4a (7.1%).

In staging post-radical prostatectomy.

Table (20): Post radical prostatectomy staging:

		No	*%*
	T2a	18	32.1
	T2b	20	35.7
	T3a	2	3.6
Postoperative Staging	T3b	6	10.7
	T3c	6	10.7
	T4a	4	7.1
	Total	56	100.0

11-Comparison between Radical prostatectomy specimen and needle biopsy according to laterality of the disease:

- Of 56 patients, there were 36 patients had bilateral disease in needle biopsy, and all the 36 patients had bilateral disease in final pathology (100%).
- There were 20 patients had unilateral disease in needle biopsy, 16 patients had unilateral disease (80%), and 4 patients had unilateral disease (20%) in final pathology.

Table (21): Comparison between RP and Biopsy according to Laterality:

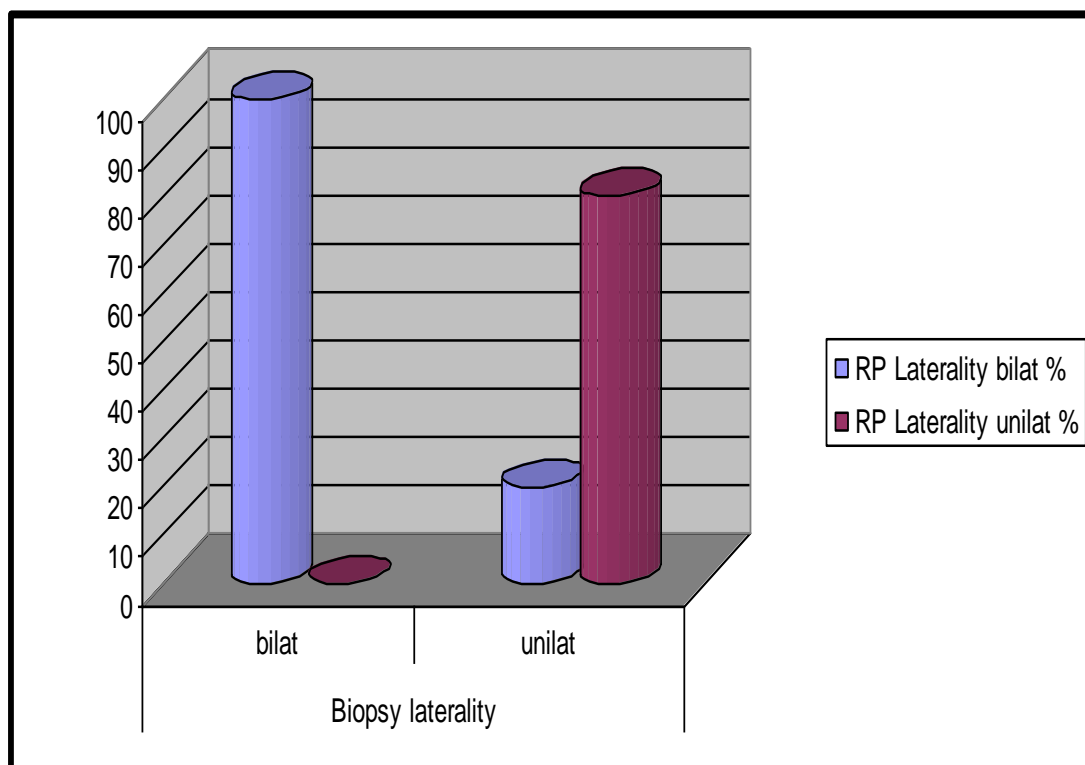|		RP Laterality						X^2	p
		bilateral		unilateral		Total			
		no	%	no	%	no	%		
Biopsy laterality	Bilateral	36	100	4	20	40	71.5	23.8	<0.001
	Unilateral	0	0	16	80	16	28.5		
	Total	36	64.3	20	35.7	56			

Fig (33): Comparison between RP and Biopsy according to laterality.

12-Correlation of Gleason scores obtained from needle biopsy and Radical prostatectomy specimens:

- In this study:

- Gleason score 4, there were 4 patients in needle biopsy become 5 in Radical Prostatectomy specimen.

- Gleason score 5 in needle biopsy was the same Gleason score in Radical Prostatectomy specimen and only 2 patient become Gleason Score 6 in Radical Prostatectomy specimen.

- Gleason score 6 in needle biopsy:

*2 cases become Gleason score 5.

* 10 cases become the same Gleason score 6.

* 2 cases become Gleason score 7.

In Radical Prostatectomy specimen

- Gleason score 7 in needle biopsy:

* 28 cases become the same Gleason score 7.

* 4 cases become Gleason score 8.

In Radical Prostatectomy specimen.

Table (22): Relation between RP and Biopsy according to Gleason Score:

		RP G.S					X^2	p
		5	6	7	8	Total		
Biopsy Gleason Score	4	2	0	0	0	2	36.3	<0.001
	5	2	1	0	0	3		
	6	1	5	1	0	7		
	7	0	0	14	2	16		
	Total	5	6	15	2	28		
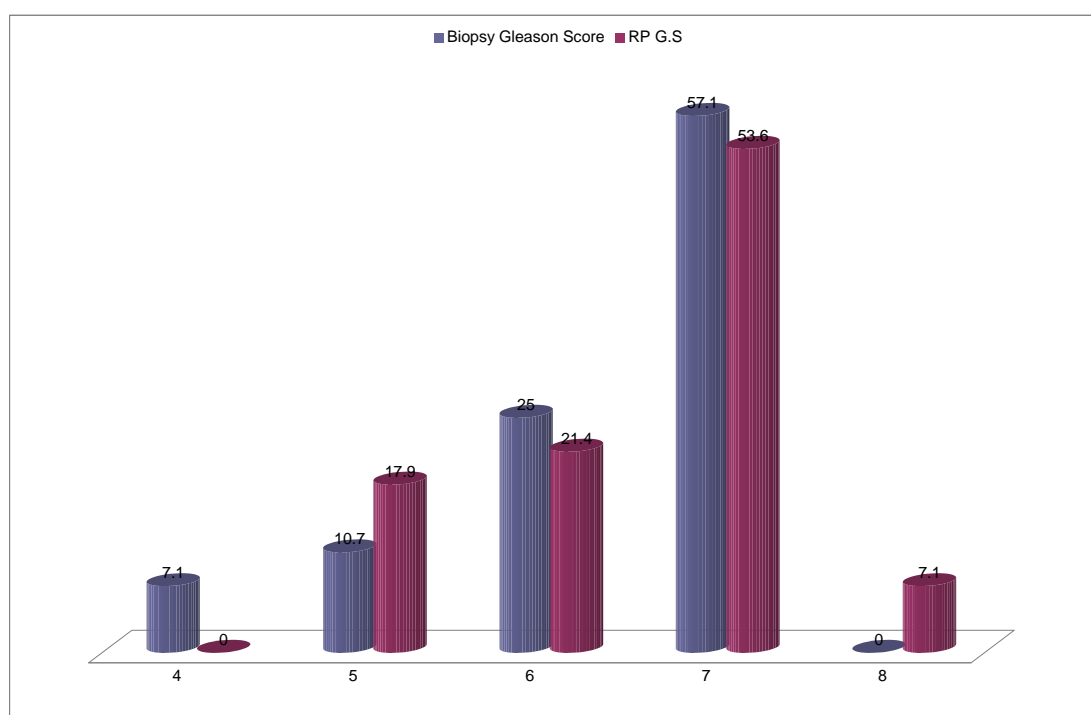
Fig (34): Relation between RP and Biopsy according to Gleason Score.

13-Correlation of Gleason pattern (sum) obtained from needle biopsy and Radical prostatectomy specimens:

-Of the 56 patients in this study:

* Biopsy Gleason pattern (2+2):

- 4 cases between Gleason sum (3+2),

In Radical prostatectomy specimens.

* Biopsy Gleason pattern (3+2):

- 4 cases become Gleason pattern (3+2),

- 2 case become Gleason pattern (3+3),

In Radical prostatectomy specimens.

* Biopsy Gleason pattern (3+3):

- 2 case become Gleason pattern (3+2),

- 10 cases become Gleason pattern (3+3),

- 2 case become Gleason pattern (3+4),

In Radical prostatectomy specimens.

* Biopsy Gleason pattern (3+4) :

- 10 cases become Gleason pattern (3+4),

- 12 cases become Gleason pattern (4+3),

In Radical prostatectomy specimens.

* Biopsy Gleason pattern (4+3):

-2 case become Gleason pattern (3+4),

-4 cases   become Gleason pattern (4+3),

-4 cases   become Gleason pattern (4+4),

   In Radical prostatectomy specimens

Table (23): Relation between RP and Biopsy according to Gleason Pattern:

		RP G.P						X^2	p
		3+2	3+3	3+4	4+3	4+4	Total		
Biopsy Gleason Pattern	2+2	2	0	0	0	0	2	45.6	<0.001
	3+2	2	1	0	0	0	3		
	3+3	1	5	1	0	0	7		
	3+4	0	0	5	6	0	11		
	4+3	0	0	1	2	2	5		
	Total	5	6	7	8	2	28		
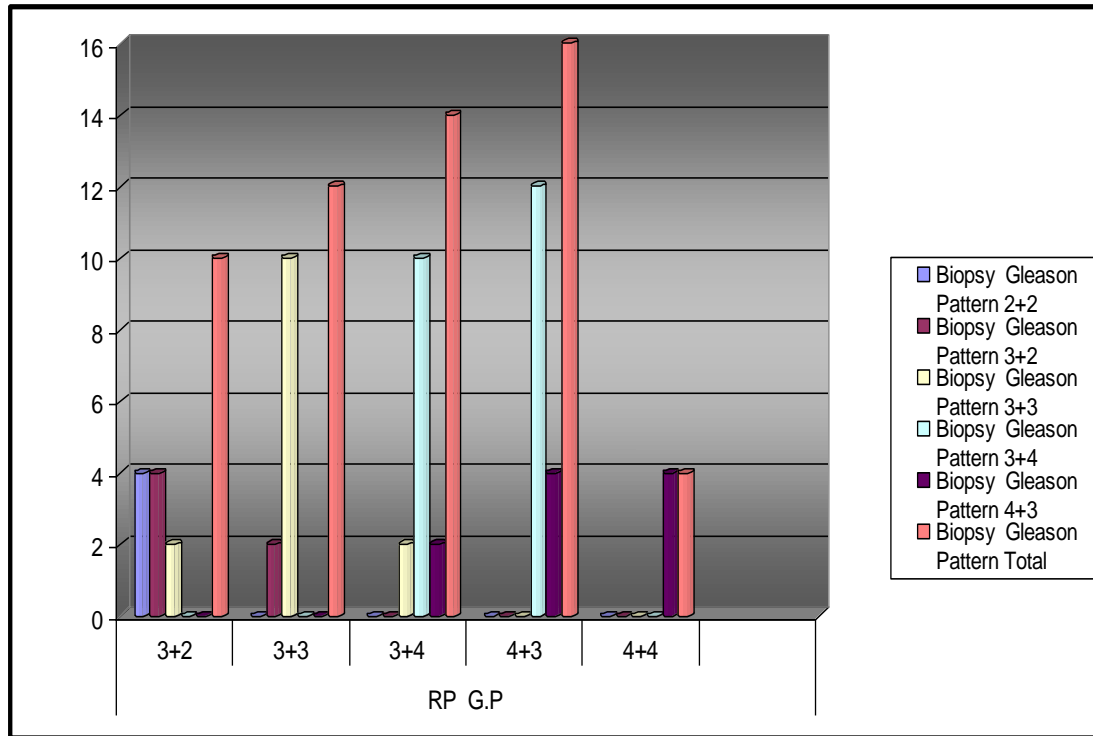
Fig (35): Relation between RP and Biopsy according to Gleason Pattern.

14-Differences in Gleason scores between biopsy and Radical prostatectomy specimens:

-   There was no difference in Gleason score in 28 cases (50%) between biopsy and Radical prostatectomy specimens, but scores were downgraded in 24 cases (42.9%) of Radical prostatectomy specimens and upgraded in 4 cases (7.1%) of Radical prostatectomy specimens.

Table (24): Difference in Gleason score between biopsy and RP:

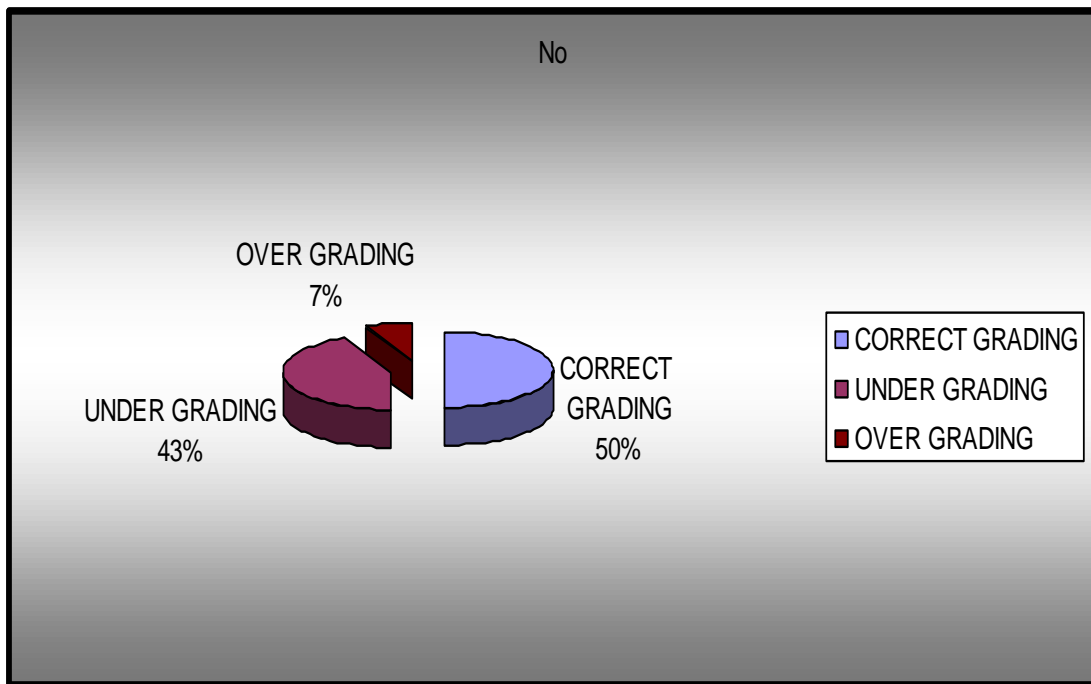|	Correct grading	under grading	Over grading
No	14	12	2
%	50	42.9	7.1
Z1(between No difference and Down grade)	0.4	P1	>0.05
Z2(between No difference and Over grade)	3.6	P2	<0.001
Z3(between Over grade and Down grade)	3.1	P3	<0.001

Fig (36): Difference in Gleason score between biopsy and RP.

15-Concordance and accuracy of Gleason score in needle biopsy and Radical prostatectomy specimens using Gleason score group:

- We classified the patients according to biopsy Gleason score into:
  * Well differentiated group: Gleason score (2-4), 4 patients
  * Moderately differentiated group: Gleason score (5-6), 20 Patients.
  * Intermediate differentiated group: Gleason score 7, 32 patients.
  * Poorly differentiated group: Gleason score (8-10), No cases.

-We found that:
  * In well differentiated group: Gleason score (2-4), under grading in 4 Cases (100%) of Radical prostatectomy specimens.

  *In moderately differentiated group: Gleason score (5-6),
   -under grading in 4 cases (20%),
   - No difference in 14 cases (70%),
   - Over grading in 2 cases (10%),
   Of Radical prostatectomy specimens.

  * In Intermediate differentiated group: Gleason score 7,
   - Under grading in 16 cases (50%),
   - No difference in 14 cases (43.75%),
   - Over grading in 2 cases (6.25%),
   Of Radical prostatectomy specimen.

Table (25): Concordance and accuracy of Gleason score in needle biopsy and Radical prostatectomy specimens.

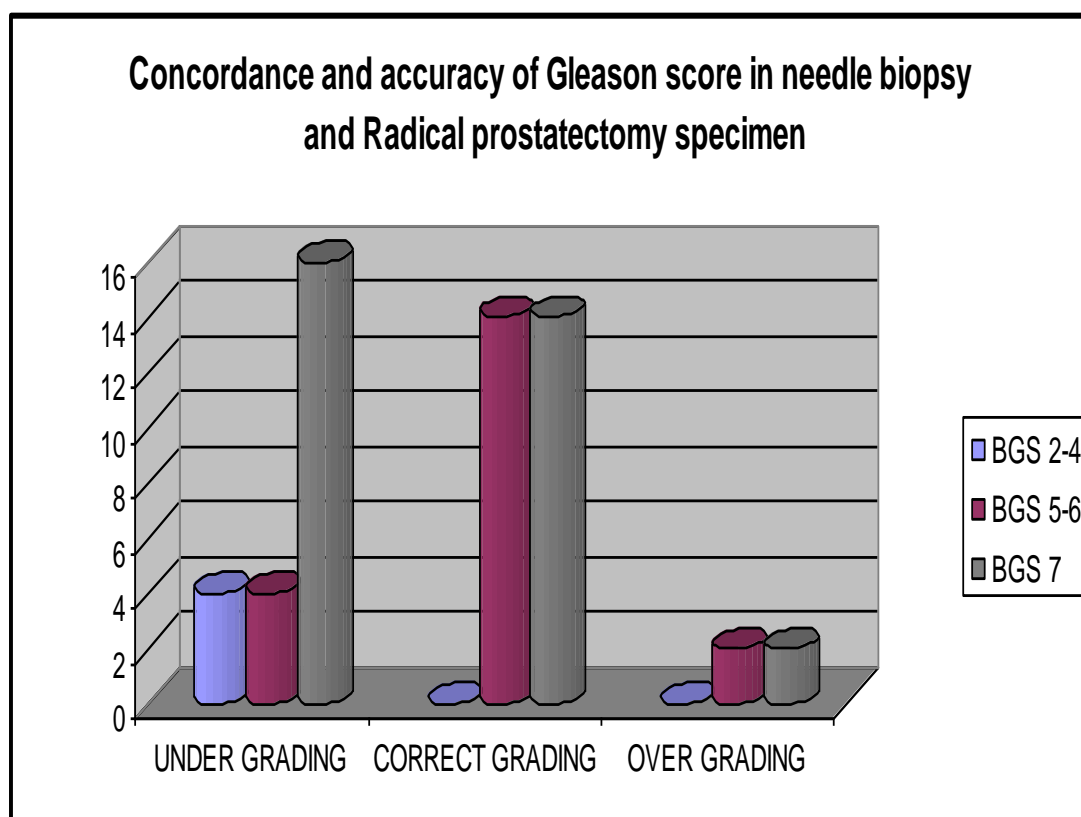|	*BGS*			
	2-4	5-6	7	Total
UNDER GRADING	4(100%)	4(20%)	16(50%)	24
CORRECT GRADING	0	14(70%)	14(43.75%)	28
OVER GRADING	0	2(10%)	2(6.25%)	4
Total	4	20	32	56

Fig (37): Concordance and accuracy of Gleason score in needle biopsy and Radical prostatectomy specimens.

16-Correlation of needle biopsy Gleason score and pathological stage using Gleason score group:

- In well differentiated group: Gleason score (2-4), there were 4 cases and there were no surgical margin invasion, or extracapsular extension also no seminal vesicle invasion. In addition, there was no lymph node involvement.

- In moderately differentiated group: Gleason score (5-6), There were 20 cases and there were no surgical margin invasion, or Extracapsular extension also no seminal vesicle invasion .In addition, there was no lymph node involvement.

- In Intermediate differentiated group: Gleason score 7, There were 32 cases:

- 6 cases had surgical margin invasion (18.75%).
- 14 cases had   extracapsular extension (43.75%).
- 12 cases had seminal vesicle invasion (37.5%).
- 18 cases had lymph node involvement (56.25%).

Table (26):Correlation of needle biopsy Gleason score and pathological stage:

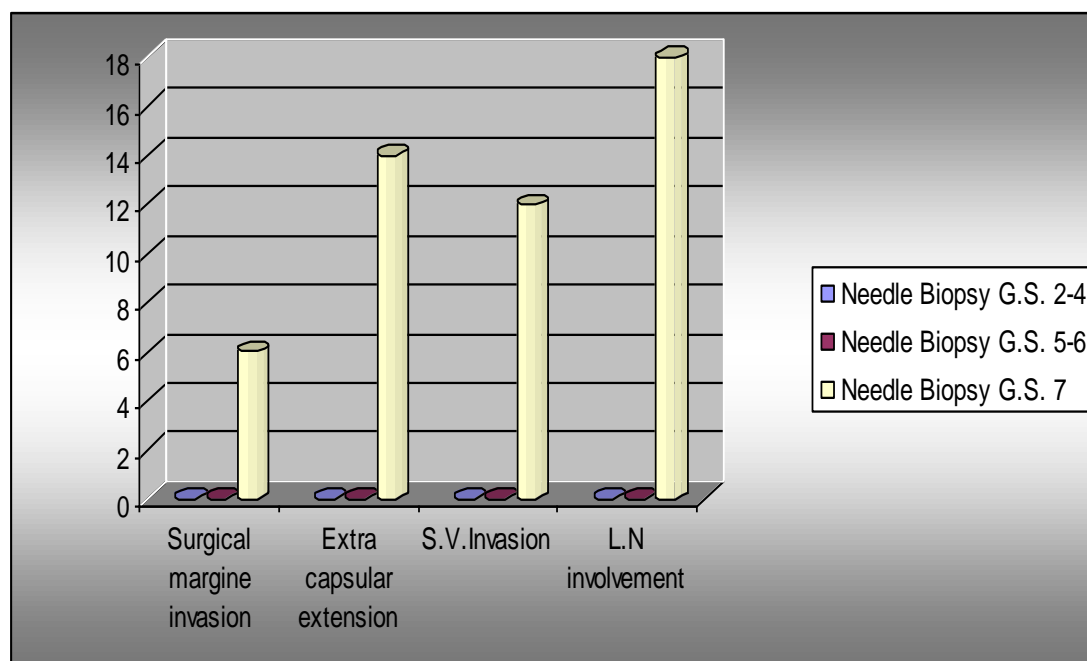|	*Needle Biopsy G.S.*			
	2-4	5-6	7	8-10
No. of cases	4	20	32	0
Surgical margine invasion	0	0	6(18.75%)	
Extra capsular extension	0	0	14(43.75%)	
S.V.Invasion	0	0	12(37.5%)	
L.N involvement	0	0	18(56.25%)	

Fig (38): Correlation of needle biopsy Gleason score and pathological stage.

17-Correlation of Radical prostatectomy specimen Gleason score and pathological stage:

- No cases had Gleason score (2-4) in well-differentiated group.
- In moderately differentiated group: Gleason score (5-6), There were 22 cases and there were no surgical margin invasion, or extracapsular extension also no seminal vesicle invasion. In addition, there was no lymph node involvement.

- In Intermediate differentiated group: Gleason score 7, There were 30 cases:
    - 2 case had surgical margin invasion (6.66%).
    - 10 cases had   extracapsular extension (33.3%).
    - 8 cases had seminal vesicle invasion (26.6%).
    - 14 cases had lymph node involvement (46.6%).

- In Poorly differentiated group :Gleason score (8-10), There were 4 cases:
     The 4cases had surgical margin invasion, extracapsular extension, seminal vesicle invasion, and lymph node involvement.

Table (27): Correlation of Radical prostatectomy specimens Gleason score and pathological stage:

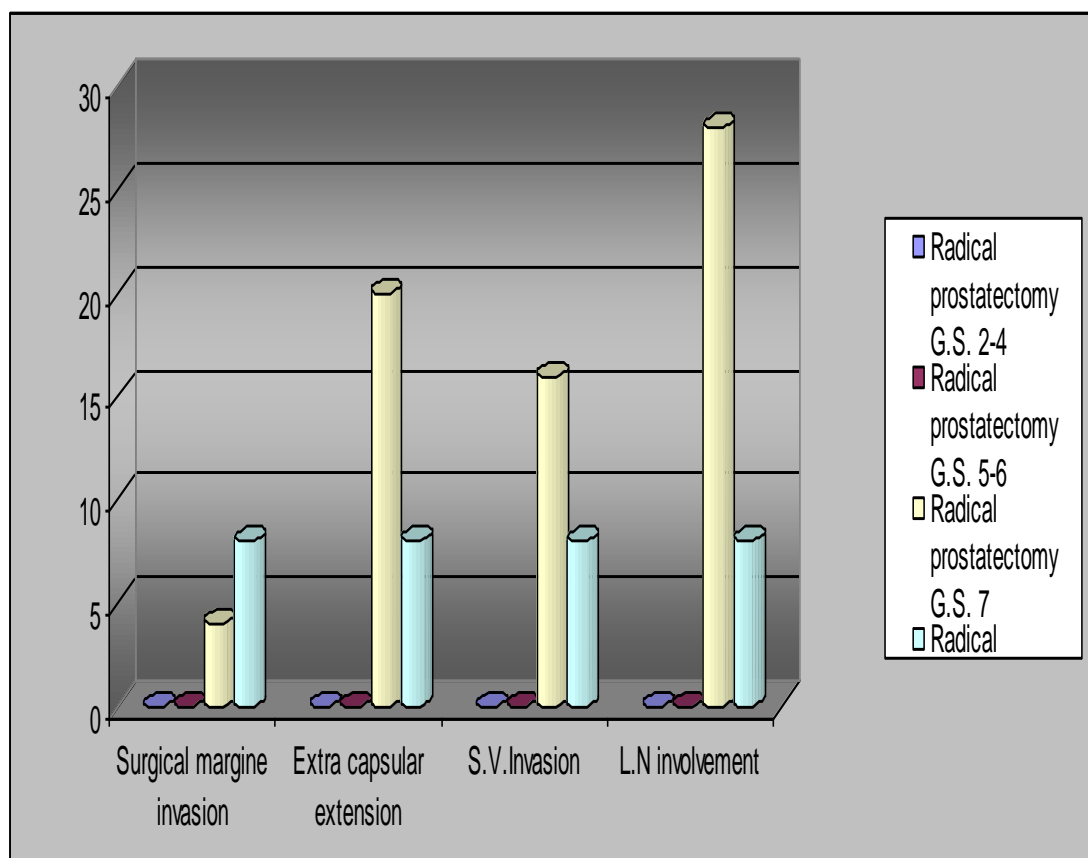|	R.P. G.S.			
	2-4	5-6	7	8-10
No. of cases	0	22	30	4
Surgical margine invasion	0	0	2 (6.66%)	4(100%)
Extra capsular extension	0	0	10(33.3%)	4(100%)
S.V.Invasion	0	0	8(26.6%)	4(100%)
L.N involvement	0	0	14(46.6%)	4(100%)

Fig (39): Correlation of Radical prostatectomy specimens Gleason score and pathological stage.

18-Correlation accuracy of Gleason score in needle biopsy and Radical prostatectomy specimen and pathological stage:

- In under grading group : there were 24 cases :
  - 4 cases had surgical margin invasion (16.6%).
  - 10 cases had   extracapsular extension (41.6%).
  - 8 cases had seminal vesicle invasion (33.3%).
  - 12 cases had lymph node involvement (50%).

- In correct grading group : there were 28 cases :
  - 2 case had surgical margin invasion (7.1%).
  - 4 cases had   extracapsular extension (14.2%).
  - 4 cases had seminal vesicle invasion (14.2%).
  - 6 cases had lymph node involvement (21.4%).

-In over grading group: there were 4 cases:
All cases had no surgical margin invasion, extracapsular extension, seminal vesicle invasion or lymph node involvement.

Table (28): Correlation accuracy of Gleason score in needle biopsy and Radical prostatectomy specimens and pathologica stage:

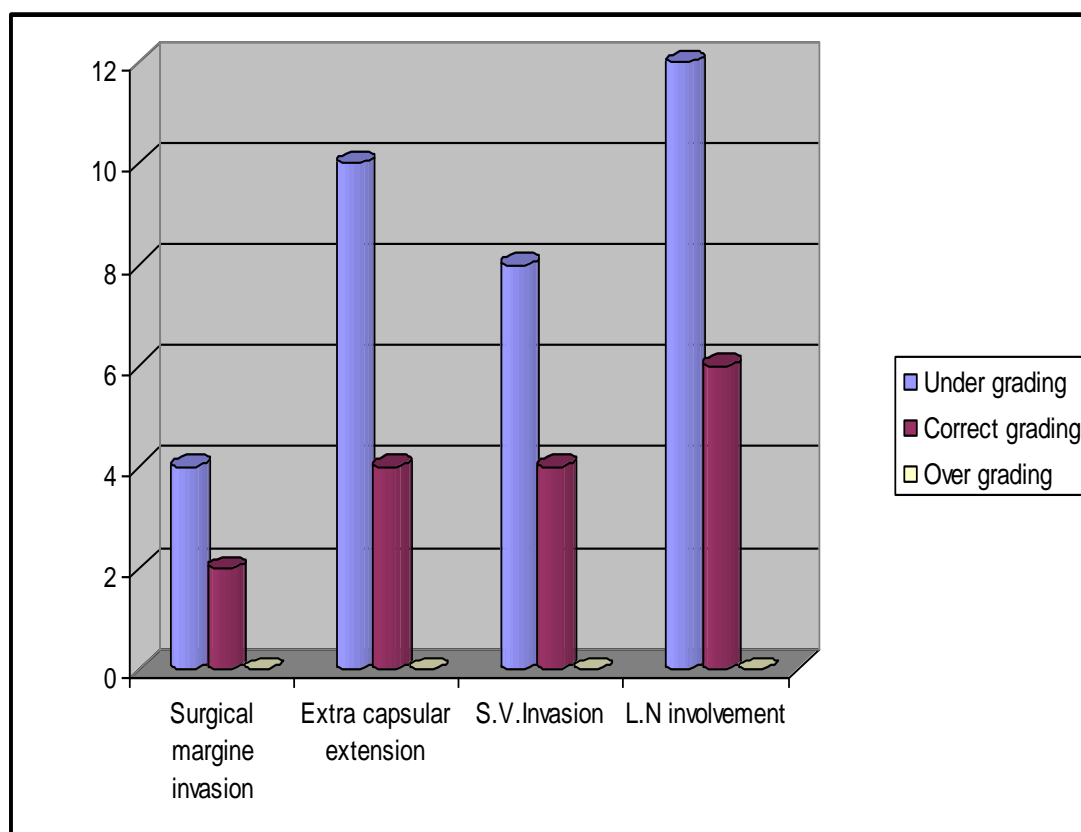|	*Under grading*	*Correct grading*	*Over grading*
No. of cases	24	28	4
Surgical margin invasion	4(16.6%)	2(7.1%)	0
Extra capsular extension	10(41.6%)	4(14.2%)	0
S.V.Invasion	8(33.3%)	4(14.2%)	0
L.N involvement	12(50%)	6(21.4%)	0

Fig (40): Correlation accuracy of Gleason score in needle biopsy and Radical prostatectomy specimens and pathological stage.

19-Comparison of preoperative and postoperative staging:

- Of 56 cases in this study , and according to T.N.M classification :

  - 20cases had T2a staging preoperative :

    -18 cases of them had T2a post operative

    - 2 case had T3c post operative.

  - 36 cases had T2b staging preoperative :

    - 20 cases of them had T2b post operative

    - 2 case had T3a post operative

    -6cases had T3b post operative

    - 4 cases had T3c post operative

    - 4 cases had T4a post operative.

Table (29): Comparison between Preperative and Postoperative Staging:

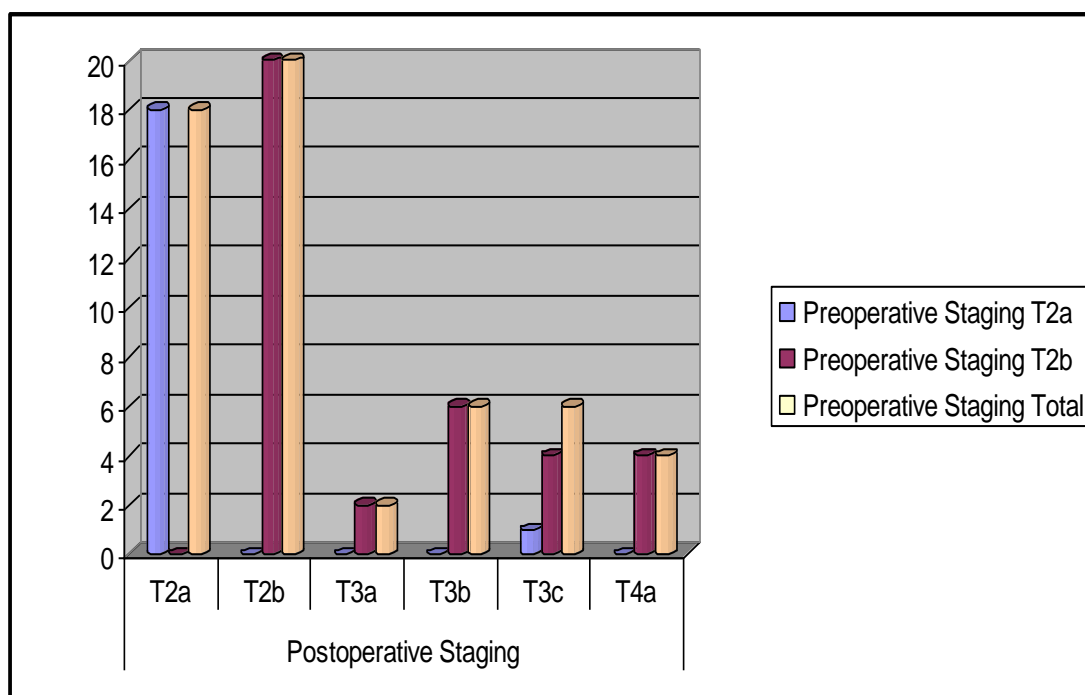|		Postoperative Staging						
		T2a	T2b	T3a	T3b	T3c	T4a	Total
Preoperative Staging	T2a	18	0	0	0	2	0	20
	T2b	0	20	2	6	4	4	36
	Total	18	20	2	6	6	4	56

Fig (41): Comparison between Preperative and Postoperative Staging.