

* , † , ‡ , * , * , * , * , * , *

가	26	가	가	가	가	가	가	가	가	가
가	25	가	가	가	가	가	가	가	가	가
가	24.7 mmHg	가	가	가	가	가	가	가	가	가
가	12.5 mmHg	가	가	가	가	가	가	가	가	가
가	36 mmHg	가	가	가	가	가	가	가	가	가
가	24.7 mmHg	가	가	가	가	가	가	가	가	가
가	29.7 mmHg	가	가	가	가	가	가	가	가	가
가	36 mmHg	가	가	가	가	가	가	가	가	가

1950 Young (Interstitial Fluid Pressure : IFP) Roh⁸⁾ 13
 Interstitial Fluid Pressure : TIFP Jain⁷⁾ TIFP가 monoclonal antibodies (Tumor TIFP TIFP TIFP가^{8,9)})

1998

2000 2 9

2000 5 25

1998 8

1999 8

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가 가

1 cm exact test

Computed Tomography (CT)

Magnetic Resonance Imaging (MRI)

TIFP 1 26 TIFP

14 18 1 44 78 (median 61)

TIFP TIFP 23 3 Squamous cell carcinoma가 12 adeno- carcinoma가 5 small cell carcinoma가 3

14 18 TIFP 2 15 cm (median 3 cm)

가 TIFP 25 가

wick-in-needle (WIN) technique TIFP 24.7 mmHg (Table 1).

25 gauge 5 mm 3 가 TIFP가 marginal 가

mm side hole TIFP (Fig. 1, $p=0.06$), 가

Nylon filament (6-0 ethilon)가 TIFP (Fig 2, $p=0.43$). 9 TIFP

heparinized saline (70 units/ml) 가 , TIFP

polyethylene tube (pressure transducer) polyethylene tube 12.5 mmHg TIFP가

gas calibration (Table 1, $p=0.009$).

base line calibration 가 ($p=0.229$).

0, 15, 30 cm 0, 16.5, 23 TIFP ($p=0.75$).

mmHg 가 (supine position) 가 TIFP

36 mmHg

29.7 mmHg ($p=0.75$)

tube 가 polyethylene 5 10

가 ± 3 mmHg TIFP

1950 Young

14 18 .^{1 6)} IFP free interstitial fluid dis-

1 CT MRI tensibility .¹⁰⁾

3 - 5 +5

protocol SAS mmHg TIFP 0 110 mmHg

TIFP .^{2, 7 9, 11)}

TIFP T-test TIFP

TIFP TIFP TIFP

(correlation analysis) , TIFP가 가

Fisher's

Table 1. Patient Characteristics and Tumor Interstitial Fluid Pressure

No	Age	Sex	Diagnosis	1st tumor dia. [*] (cm)	2nd tumor dia. [†] (cm)	1st TIFP [‡] (mmHg)	2nd TIFP [§] (mmHg)	TIFP	Response
1	57	F	breast	2.5	2.2	22	4	- 18	CR
2	48	M	nasopharynx	2.3	-	8	-	-	CR
3	78	M	lung	2	-	- 3.5	-	-	
4	59	M	lung	15	-	49	- 0.5	- 49.5	PR ¶
5	68	M	lung	2	-	5	-	-	no RT
6	44	M	bladder	4	10	91	5	- 86	no RT
7	69	M	stomach	8	-	36	2	- 34	CR
8	67	M	lung	2.3	-	4	-	-	CR
9	72	M	lung	2.5	-	fail	-	-	no RT
10	63	M	oropharynx	3.2	-	8	-	-	
11	62	M	lung	8	-	4	fail	-	CR
12	65	M	lung	2	-	1.25	-	-	no RT
13	54	M	lung	4	-	59	-	-	no RT
14	57	M	lung	4.5	-	14.5	-	-	PR
15	60	M	tongue	3	-	- 1	-	-	PR
16	61	F	supraglottis	2	-	2.5	-	-	CR
17	61	F	hard palate	2	-	0	-	-	
18	78	M	thyroid	7	5.5	78	3	- 75	CR
19	76	M	submandibular	2	-	36.5	-	-	PR
20	70	M	MUO	7	-	10	-	-	no F/ U
21	46	M	nasopharynx	2	-	5	-	-	CR
22	57	M	hypopharynx	3.5	-	24.5	8	- 16.5	no F/ U
23	54	M	oropharynx	6	5	40	30	- 10	PR
24	63	M	nasopharynx	4	-	39.5	22	- 17.5	CR
25	55	M	base of tongue	4	2	40	39	- 1	
26	59	M	lung	2	-	44	-	-	CR

mean : 24.7 12.5 *p*=0.009*

*preradiotherapy tumor diameter, †postradiotherapy tumor diameter, ‡preradiotherapy tumor interstitial fluid pressure, complete response, §postradiotherapy tumor interstitial fluid pressure, ¶partial response, #There was statistically significant relationship between preradiotherapy tumor interstitial fluid pressure and postradiotherapy tumor interstitial fluid pressure.

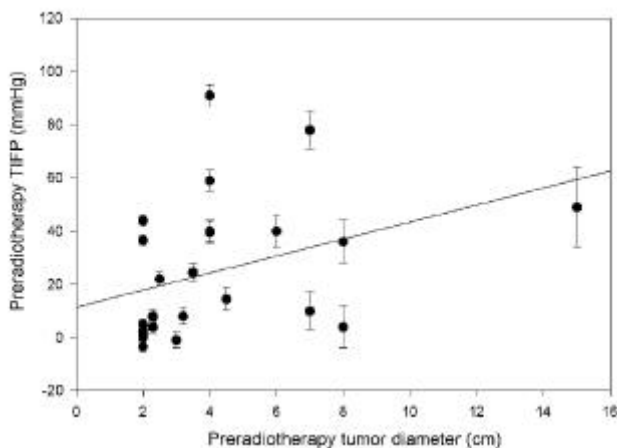


Fig. 1. Relation between preradiotherapy tumor diameter and preradiotherapy tumor interstitial fluid pressure. There was marginally statistical significant correlation in both variables ($R=0.372$, $p=0.06$).

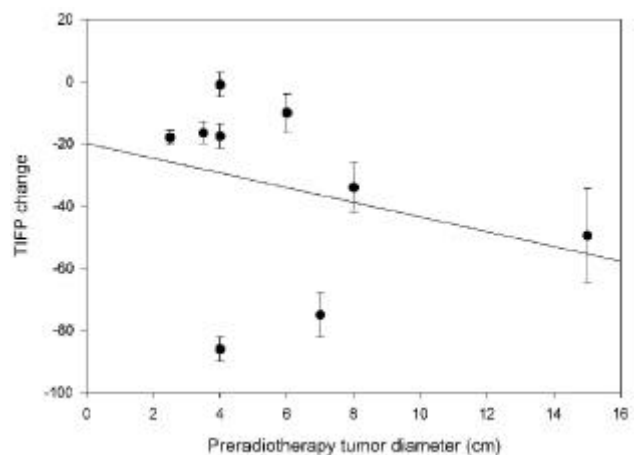


Fig. 2. Relation between preradiotherapy tumor diameter and tumor interstitial pressure change. Tumor interstitial fluid pressure change means difference between preradiotherapy tumor interstitial fluid pressure and postradiotherapy tumor interstitial fluid pressure. There was no statistical significant correlation in both variables ($p=0.43$).

5 :

nude mouse human tumor xenografts 13 TIFP 8

10 가 5 . Side hole end hole tube

20 30 TIFP communication 가

9) TIFP Gutman 11) 19 가 가

13.16 mmHg (4 33 mmHg) TIFP 가

가 TIFP Gutman TIFP 가

12) 25 TIFP TIFP TIFP가

4 39 mmHg 가 가 TIFP 가

가 TIFP 가 TIFP

mmHg Gutman TIFP가 marginal TIFP

(Fig. 1, $p=0.06$). TIFP TIFP가 8, 9)

Milosevic 9) 77 TIFP TIFP가 가

($p<0.004$) TIFP가 가 TIFP가 가

가 Roh 8) 13 TIFP TIFP가 가

TIFP TIFP TIFP Nuclear magnetic resonance

가 TIFP TIFP

TIFP 가 (Fig 2, $p=0.43$). 가

mmHg TIFP 36

29.7 mmHg (p=0.75) 9

가 TIFP 가 TIFP가 (macromolecule)

가 , 가 TIFP

end hole 5 mm 3 mm TIFP

side hole 가 가 가

1 cm 가 1 cm 가

8) TIFP TIFP Roh 가

TIFP가

가

7, 14)

TIFP

가

2, 3)

nicotinamide pentoxi-

fylline

TIFP

Nicotinamide phentoxiphylline

basic RNase

protein (P-30 protein) Onconase가

15)

16)

Onconase가 RNA

Onconase가

가

가

가

TIFP가 가

TIFP가 가

biopsy needle TIFP

needle

TIFP

11)

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Abstract

The Change of Tumor Interstitial Fluid Pressure by
Radiation Therapy in Patients with Metastatic Lymph Node in
Head and Neck Area

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Purpose : To determine if the tumor interstitial fluid pressure (TIFP) and/or its change in patients with metastatic lymph node in head and neck area can predict radiotherapy outcome.

Materials and Methods : In 26 biopsy proven metastatic lymph node patients in head and neck area with accessible by direct inspection and palpation, and of sufficient thickness (>1 cm) to permit accurate needle placement, we measured TIFP at cervical lymph node before and during radiotherapy. Tumor size was measured clinically and radiologically.

Results : The mean preradiotherapy TIFP was 24.7 mmHg. Preradiotherapy TIFP had marginally significant relationship with tumor size ($p=0.06$). Preradiotherapy TIFP significantly decreased when tumor size decreased ($p=0.009$). Preradiotherapy TIFP was not different between complete response group and group with partial or less response ($p=0.75$). Radiotherapy outcome was not different between group with above and group with below than average TIFP ($p=0.229$). TIFP decreased 36 mmHg in complete response group and 29.7 mmHg in group with partial or less response.

Conclusion : The mean TIFP was elevated with 24.7 mmHg. Preradiotherapy TIFP had marginally significant relationship with tumor size ($p=0.06$). TIFP decreased 36 mmHg in complete response group and 29.7 mmHg in group with partial or less response but there was no statistically significant relationship in two groups.

Key Words : Tumor interstitial fluid pressure, Radiotherapy, Head and neck cancer