

A STUDY OF THE TNM STAGING SYSTEM FOR NASOPHARYNGEAL CARCINOMA (NPC)

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Two-hundred and six patients with NPC who had nasopharynx examined with computer tomography (CT) prior to their primary radiotherapy were collected to evaluate the staging system for NPC recommended by Changsha Conference in 1979 (79' system) and that by Fuzhou conference in 1992 (92' system). The overall 5-year survival rate of this group was 41.3% (85/206). Clinically staged by 92' system, 206 cases distribute as follows: 2.6% in stage I, 22.7% in stage II, 46.9% in stage III, 24.2% in stage IV and 3.6% in stage IVb, their 5-years survival rate ranges from 80%, 65.9%, 40.7%, 31% to 0%. The authors suggest: 1. primary lesions limited in nasopharyngeal cavity be ranked as T1; 2. stage IV be divided into stage IVa (T4 or/and N3 and M0) and IVb (M1, and any T, any N).

Key words: NPC, TNM, Survival rate

The TNM staging system for NPC proposed by Changsha conference has been used for more than 10 years in China and basically reflects the prognosis of the patients.^{1,2} During these years, the role of CT scan in staying has been more heavily stressing on. we reviewed 206 cases with NPC who had their nasopharyngeal CT scans performed prior to their first courses of radiation, trying to find a more reasonable clinical staging system for NPC by comparison of 92' system with 79' system.

MATERIALS AND METHODS

Clinical Data

The authors collected 206 patients with NPC who had nasopharynx detected with CT scan prior to their primary radiation from October, 1987 to May 1991. There were 170 males and 36 females ranging in age from 19 to 71 years, and 173 patients aged 31-60 years consist of 84% of the whole group. Poorly differentiated squamous cell carcinoma constituted the majority of the cancer (177/206 or 85.9%).

Irradiation

External beam irradiation was administered to 78 cases with ⁶⁰Co- γ -ray and to 128 cases with 8 Mv-high energy X-ray. Treatment fields covered nasopharynx, base of skull and neck with a total tumor dosage of approximately 70 Gy in 7 weeks to primary lesion. To those whose lesions extending to later parapharyngeal space posterior to styloid process, two opposed parallel combined facial-neck portals at 40 Gy in 4 weeks followed by reduced portals were given. To those with involvement of anterior group of cranial nerves or/and destruction of bones of base of skull, base of skull fields were used. To those whose posterior group of cranial nerves were injured, enlarged pre-auricular portals were applied or posterior auricular portals were added to a total tumor dose of 80 Gy in 8 weeks, 70 Gy in 7 weeks was delivered to positive neck nodes, a boost of 10 Gy in 1

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week with high energy β -ray was given to residual lesions, 50 Gy in 5 weeks was administered to negative node neck.

RESULTS

Follow-up were maintained over 5 years to which 12 patients were lost who were counted as deaths. The follow-up rate was 94.2%. The survival period was calculated respectively from the first day of the treatment to the last day of follow-up or death, the overall 5-year survival rate of this group was 41.3% (85/206).

To compare between these two staging systems, 187 cases of this group (except for 12 patients lost to follow-up and 7 cases with remote metastases, all of which were ranked as M1) were reviewed and analyzed according to relationship of T-stage of primary lesion, N- stage of neck node staged by two

different staging systems to their 5-year survival rates. The following Tables show the results:

Table 1. distribution of T-stage and N-stage staged by two staging systems

	92' system		79' system		
	cases	%	cases	%	
T	T1	40	21.4	52	27.8
	T2	63	33.7	75	40.1
	T3	57	30.5	52	27.8
	T4	27	14.4	8	4.3
N	N0	34	18.2	34	18.2
	N1	64	34.2	39	31.5
	N2	69	36.9	83	44.4
	N3	20	10.7	11	5.9

Table 2. The 5-year survival rate (%) of T1-4 staged by two staging systems

	T 1	T 2	T 3	T 4
92' system	65.0 (26/40)	52.4 (33/63)	33.3 (19/57)	25.9 (7/27)
79' system	57.7 (29/52)	49.3 (38/75)	30.8 (16/52)	25.0 (2/8)

Table 3. Correlation of 5-year survival rate (%) for T1-4 patients with N0-3

	92' system	79' system	
T1	80.0 (4/5)	66.7 (4/6)	
T2	60.0 (6/10)	75.0 (6/8)	
N0	T3	53.8 (7/13)	55.6 (11/18)
	T4	66.7 (4/6)	50.0 (1/2)
N1	T1	75.0 (12/16)	68.8 (11/16)
	T2	68.8 (11/16)	52.2 (12/23)
	T3	16.7 (3/18)	18.8 (3/16)
N2	T4	14.3 (2/14)	----- (1/4)
	T1	50.0 (7/14)	45.8 (11/24)
	T2	42.8 (12/28)	46.3 (19/41)
N3	T3	38.1 (8/21)	12.5 (2/16)
	T4	16.6 (1/6)	----- (0/2)
	T1	60.0 (3/5)	50.0 (3/6)
N3	T2	44.4 (4/9)	33.3 (1/3)
	T3	----- (1/5)	----- (1/2)
	T4	----- (0/1)	-----

DISCUSSION

Standard of T-Stage

CT scan takes advantage of highly resolving power which can show clearly adjacent structure involvement beyond nasopharynx and impaired bone of base of skull which are difficult for radiophotography to present. It was reported that 61.5 — 67.1% of T- stage went up after their CT scan examinations. Patients with T1-stage increased after their CT scan examinations. Patients with T1-2 by 79' system constitute 67.9% of the whole group. T4 only 4.3%, while T1-2 stage by 92' system decline after CT scan detection and T4 compose of 14.4% of all cases. T- stage distribution by 92' system was more reasonable and accurate (Table 1). The 5-year survival rate for T1,2 was 57.7%, 49.3%, respectively the difference was not statistically significant ($P>0.05$) (Table 2), nor is that between T1 and T2 with N0, 1, 2,

3 (Table 3). That is to say: it is unnecessary to classify primary lesions limited to one wall or at juncture of two walls as T₁ and cancers extending to or beyond two walls as T₂. The 5-year survival rate was 65% for T₁ by 92' system whose tumours limited within nasopharyngeal cavity, including those confined to one wall or occupying the whole nasopharyngeal cavity or defying clinical examinations, there is only nonstatistic difference among their survives. Therefore, we prefer 92' system which ranks primary lesions limited in nasopharynx as T₁. The 5-year survival rate for T₁₋₄ by 92' system was 65%, 52.4%, 33.3% and 25.9%, respectively, these gradually declining figures show that T-stage of 92' system is appropriate.

Standards of N-stage

Both N-stage of two systems were set up on

Table 4. The 5-year survival rates for N0-3 by two staging system

	N0	N1	N2	N3
92' system	61.8 (21/34)	43.8 (28/64)	40.6 (28/69)	40.0 (8/20)
79' system	61.8 (21/34)	45.8 (27/59)	38.6 (32/83)	45.4 (5/11)

Table 5. The 5-year survival rates for patients with T1-2

	T1-2 92' system	T1-2 79' system
N0	66.7 (10/15)	71.4 (10/14)
N1	71.9 (23/32)	59.0 (23/39)
N2	45.2 (19/42)	46.2 (30/65)
N3	50.0 (7/14)	44.4 (4/9)
Total	57.3 (59/103)	52.8 (67/127)

Standards of Stage M:

Seven cases with remote metastasis all died within one year after their diagnosis, this outcome is similar to other reports.^{2,6} The 5-year survival rate for patients consisting of T₄, N₃, M₀ was 31.9%, in contrast to 0% for M₁ patients. To sum up, it is suitable for 92' system to divide stage IV into stage

basis of such prognostic related indicators as the size mobility and location of neck nodes. The only difference between them is the index figure of size of neck node. The figure < or = 3 cm, 3.1 — 7.9 cm, >8.0 cm was referred to N₁, N₂, N₃ by 79' system, respectively. While < or = 4 cm, 4.1 — 7.0 cm, >7.1 cm to N₁, N₂, N₃ by 92' system, respectively. We compared the 5-year survival rate for N₁₋₃ by these two systems. That was 45.8% Vs 43.8%, 38.6% Vs 40.6%, 45.4% Vs 40.0%, respectively and, each difference was not statistically significant (*P* >0.05) (Table 4), and for those patients with T₁₋₂, that was 59% Vs 71.9%, 46.2% Vs 45.2% and 44.4% Vs 50.0%, respectively, nor was it statistically significant (Table 5) (*P* >0.05). So we think that the N-stage standards for NPC made by changsha conference is still practicable.

IVa (T₄ or N₃, M₀) and stage IVb (any T, N, and M₁).

Combination of TNM:

In 79' system, stage I, II, III, IV distribute as 3.1%, 24.2%, 59.8% and 12.9%, and the latest figure is comparatively a small one. In 92' system, I, II, III, IVa, IVb as 2.6%, 22.7%, 46.9%, 24.2% and 3.6%, respectively, which show a fairly reasonable distribution. the 5-year survival rate for the former system was 66.7%, 61.7%, 38.8% and 28%, respectively; and for the later system, that was 80%, 65.9%, 40.7%, 31.9% and 0%, respectively, which present a gradual decrease with the advancing stage. In a word, the clinical staging system recommended by Fuzhou conference in 1992 is more rational for patients with NPC who has CT scanned.

APPENDIX

TNM Staging of NPC

Changsha system 1979		Fuzhou system 1992	
T	T0 No evidence of primary tumor.	T1	Carcinoma confined to nasopharyngeal cavity
	T1 Carcinoma confined to one wall of nasopharyngeal cavity or limited lesion at junction of two walls.	T2	Local invasion of nasal cavity, oropharynx, later opharyngeal space prior to styloid process, soft palate soft tissue prior to cervical vertebra, or partial invasion of carotid sheath area.
	T2 Carcinoma extends beyond one wall but not beyond nasopharyngeal cavity.	T3	Tumor occupying carotid sheath or damaging cranial nerves I through VI, or cranial nerves VII through XII, or invasion of base of skull, pterygoid process pterygo-palatine fossa.
	T3 Carcinoma extends beyond nasopharyngeal cavity, or tumor involves cranial nerves, or carcinoma has destructed adjacent bones (bones of base of skull, plate of pterygoid process)	T4	Injure of cranial nerves both I-VI and VII-XII, invasion of paranasal sinus, Cavernous sinus, orbitalbone, infratemporal fossa, or direct invasion of 1th, 2nd cervical vertebra.
	T4 Two or more items of T3	N0	Nonpalpable lymph node
N	N0 Nonpalpable lymph node	N1	Upper cervical node not more than 4 cm in greatest dimension with mobility
	N1 Enlarged deeper cervical lymph node with normal mobility (not more than 3 cm in diameter as referred.)	N2	Lower cervical node, or node more than 4 cm but not more than 7 cm in diameter, or with limited mobility.
	N2 Lymph node metastasis superior to supraclavicular fossa with fixation or partial mobility	N3	Supra clavicular lymph node, or node more than 7 cm in diameter, or node with fixation or with invasion of skin.
	N3 Supraclavicular lymph node metastasis or node more than 8 cm in diameter	M0	No distant metastasis
M	M0 No distant metastasis	M1	Distant metastasis
	M1 Distant metastasis		
Staging group			
	I T1 N0 M0		I T1 N0 M0
	II T1-2 N0-1 M0		II T2 N0-1 M0, T0-2 N1 M0
	III T1-3 N1-2 M0		III T3 N0-2 M0, T0-3 N2 M0
	IV T0-4 N3 M0-1		IVa T4 N0-3 M0, T0-4 N3 M0
			IVb any T, any N, M1

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