Nasopharyngeal carcinoma

By George Choa (Hong Kong)*

Nasopharyngeal Carcinoma (N.P.C.) is a rare disease amongst Caucasians, but occurs with alarming frequency amongst the southern Chinese, mainly those from the Kwangtung Province of which Hong Kong is geographically a part (Digby, 1935, 1944, 1951). The majority of Hong Kong's population is Chinese (98·3 per cent) and out of these, 84·3 per cent are Kwangtung in origin (Hong Kong Government, 1970). The total population in 1961 was 3,079,901. The most recent census (1971) has not shown any substantial change in the population, It is estimated that the morbidity rate of the disease in Hong Kong is 124 per million of population (Ho, 1966; Belamaric, 1969). This figure is nearly twenty-five times that estimated by Godtfredsen for Denmark and Sweden.

This paper describes a personal experience with over 500 cases of nasopharyngeal carcinoma in the last twelve years. Sometimes two or three new cases might be seen in one week! For this presentation, 211 cases are reviewed to provide clinical data.

The relevant anatomy of the nasopharynx, the mode of spread, clinical manifestations, objective findings, pathology, and management of the disease including complications from the tumour and its treatment will be discussed.

The mainstay of treatment is radiotherapy. Details of these procedures, however, will not be given. Readers are referred to well-established techniques used by Ho (1971), Lederman (1961) and others. The otorhinolaryngologist gives treatment for complications that may arise from the disease and from its treatment, and occasionally performs a palatal fenestration (Wilson, 1957) for the control of severe haemorrhage or to allow intracavitory irradiation.

The nasopharynx (Negus, 1961) is closely related to the foramina at the base of the skull, the sphenoidal sinus, and the nasal fossae. The Eustachian tube opening into its lateral wall forms a prominent landmark in this discussion of nasopharyngeal carcinoma. The histology of the epithelium in adults is significant in the study of the pathology (Cappel, 1958; Yeh, 1966). In adults, some 60 per cent of the respiratory epithelium found before 10 years of age is replaced by squamous epithelium (Ali, 1965, 1966).

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Pathology

Microscopically, the features are those of epidermoid carcinoma. In this series, as in others published from Hong Kong, the vast majority of cases are of the anaplastic variety (Teoh, 1957). Even among these, electron microscopy can demonstrate keratin fibrils (Svobada *et al.*, 1966). Other types of histology are rarely encountered. In patients who have died of the disease, ulcers, nodular masses, and fungating growths have been seen in specimens (Teoh, 1957). Ulceration may extend beyond the confines of the nasopharynx and erode the internal carotid artery, giving rise to fatal haemorrhage. The carotid artery may also be implicated by radiotherapy resulting in the thinning of its wall and subsequent rupture (Teoh, 1971).

Growths in the series of 211 cases are summarized as follows:

	No. of cases	*Per cent*
Fungating, large	32	15·2
Raised area	25	11·8
Nodular	21	10·0
Thick cushion	9	4·3
Ulcerative	124	58·7
	211	100·0

Age and sex

See Table I. Nasopharyngeal carcinoma occurs at a younger age than does most cancers. In this series the peak incidence is 44 years, the youngest being 18 years and the oldest 76. The youngest patient (Dawes

TABLE I.
AGE AND SEX DISTRIBUTION

Age group in years	Male	Female	Total
15–19	1	1	2
20–24	4	0	4
25–29	11	3	14
30–34	13	6	19
35–39	17	6	23
40–44	29	21	50
45–49	16	13	29
50–54	31	6	37
55–59	13	4	17
60–64	6	2	8
65–69	1	3	4
70–74	2	0	2
75–79	0	2	2
Total	144	67	211

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et al., 1969) recorded in the literature is $4\frac{1}{2}$ years of age and in Hong Kong, 13 years (Ho. 1966). In Caucasians, the peak age is higher. The male to female ratio is 2/3 to 1, and this ratio is universally true. In the Scandinavian series, however, there is female preponderance in the 65–69 year age group.

Natural history

The tumours behave differently in different individuals. The following illustrate this point clearly.

Case 1

A male Eurasian, aged 65, was operated on for a mass in the submandibular region in 1950. The pathologist's report was anaplastic carcinoma. The patient refused further treatment and was symptom-free for 6 years. Then he developed nasal obstruction and bleeding. An ulcerated tumour in the nasopharynx was biopsied and proved positive for nasopharyngeal carcinoma. The patient again refused radiotherapy. Three years later he suffered severe bleeding and received a palliative dose of conventional X-rays (250 kv.). He died in 1960 from coronary thrombosis (Ho, 1971).

Case 2

A physician, aged only 28, consulted me when he noticed blood in the postnasal drip for only two weeks. No glands nor cranial nerves were involved. Examination of the nasopharynx revealed a very small ulcer in the roof of the nasopharynx. He received a full course of radiotherapy but was dead in less than eighteen months.

Length of history

From first symptom to first consultation is roughly six months, but may vary from weeks to years.

Aetiological factors

The following factors in the aetiology are necessarily conjectural, but a discussion of them is relevant:

1. *Racial:* (Ho, 1967). In Hong Kong, the racial factor stands out prominently, as natives of the Kwangtung Province are inflicted most frequently. It has been shown by various workers that in Southeast Asian countries it is still the Chinese and the mixed races with Chinese parentage that suffer most. Chinese, for example, born and reared in the U.S.A. still have a higher rate of the disease than non-Chinese, though lower than those of the same ethnic group who have recently migrated (Martin *et al.*, 1951; Daito, 1952; Pang, 1959; Bailar, 1966; Clifford, 1960, 1961, 1966). Here an environmental factor may well be considered.

2. *Household carcinogens:* It has been suggested that deposits from fumes and smoke from cooking carry carcinogens and that these deposits

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could be a factor in the aetiology in nasopharyngeal carcinoma (Sturton *et al.*, 1966). The studies of Ho (1966) have shown that the 'boat people' in Hong Kong who, living on their fishing boats, can easily avoid the smoke from cooking and incense used in worship, have a higher incidence of nasopharyngeal carcinoma than do our land population. Furthermore, Buddhist monks, exposed to incense all day and every day are very rarely seen with the disease.

3. *Heredity:* There have been only a few families on record in which more than one sibling has suffered from the disease.

4. *Environmental:* (Keen, 1955; Bailey, 1961; Clifford, 1964). This is probably an important factor. Zippin *et al.* (1962), in studying the population of Chinese students in the University of California, the majority of whom are Cantonese from the Kwangtung Province, found that the 'observed-to-ratios' for Caucasian males ranged from 0·4 to 0·8. From the Chinese, values of at least 3·3 were noted. The extreme ratio was 28·8 for Chinese younger than 55 born outside the U.S.A.; this was eight times higher than the ratio for Chinese in the same age group who were born in the U.S.A. There was no difference in the Chinese older than 55 between those born in the U.S.A. and elsewhere. There may be a hereditary factor here but environment probably plays a greater role.

5. *Anthropological factor:* Because of a possible difference in the configuration of the Southern Chinese skull compared with that of Northerners, it is postulated that this facilitates the deposit of nasal discharge in the nasopharynx. Chronic catarrh and sinusitis are extremely common in Hong Kong. Such irritants could cause metaplasia and eventual carcinoma *in situ*. It is well known that Proetz (1941, 1953), in his studies on air currents through the nose, showed that soot tends to deposit beyond the bend of a glass tube and that if an air current is forced through a constricted portion, the soot deposits beyond the constriction. Following these principles, one may conjecture that inhaled carcinogens tend to be deposited on the posterior pharyngeal wall or find their way into the pharyngeal recess by forcible sniffing (a common Chinese habit).

6. *Allergy:* It is very significant that patients who suffer from allergic rhinitis ('the sneezers') very rarely develop nasopharyngeal carcinoma. It would be interesting to study this group of patients further. Could it be that the allergic patient has a voluminous watery discharge to wash away the carcinogens, or is his nasopharynx different? Another factor to consider here is the high concentration of immuno-globolin E in patients with allergic rhinitis (Viner, 1973).

7. *Vasomotor rhinitis:* Clifford (1966) has pointed out that in Kenya non-allergic vasomotor rhinitis with an excess of mucoid secretions is common in the Africans living in the hills where it is colder than sea level, and that this may be a factor which relates to inhaled carcinogens in the nose, rather than to other parts of the respiratory tract. The incidence of

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nasopharyngeal carcinoma is higher amongst those living in the hill country.

8. *Smoking habits:* The Indians are fond of forcibly inhaling a cigarette through a cupped hand or even smoking a cigarette with the lighted end inside the mouth.

9. *Virus:* Serological evidence (Henle *et al.*, 1907) is available that patients with Burkitt lymphoma and with anaplastic carcinoma both develop a high titre of antibodies against the Epstein-Barr virus; precipitins were also demonstrated with soluble antigen prepared from cultured Burkitt cells (De-The *et al.*, 1970; Ho, 1971). The author has seen the man of a family suffering nasopharyngeal carcinoma and the same disease in the wife a few years later. Is this a coincidence?

Site of origin of tumour

Carcinoma of the nasopharynx occurs most often in the region of the pharyngeal recess but tumours may present in the lateral, posterior walls, or roof.

	No. of cases		*Per cent*
Roof of nasopharynx	74		35·1
Fossa of Rosenmuller	62		29·4
Tubal elevation	25	Lateral wall	11·9
Lateral wall	21		10·0
Posterior wall	14		6·6
Diffused	15		7·0
	211		100·0

Common sites of disease

The boundaries of the nasopharynx are affected by carcinoma to different degrees. The Table above shows the relative frequency of involvement in this series. However, it is often impossible to determine the exact site of origin. Not only that, but carcinoma may appear to be localized by clinical examination, though involvement of the prevertebral node of Rouvier may well have already taken place. Hence, it may be impossible to be sure a case is in fact in Stage I. When first seen the tumour might have spread outside the fossa or any other site of origin and is now occupying the lateral wall, the roof, posterior wall, or the tubal elevation. It is only by observing the regression of the tumour during radiotherapy that one can determine the true site of origin.

Clinical features

The presenting symptoms are dependent on the site and extension of the tumour. The order is somewhat different from those recorded by other

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observers, where neck nodes have been given as the primary reason for specialist consultation. In this series, cases are generally seen when patients suffer from nasal bleeding, have become incapacitated by the spread of the tumour outside the confines of the nasopharynx giving rise to either cranial nerve involvement or lymph node metastasis, or when the tumour is so large as to cause nasal obstruction and difficulty in swallowing.

Before discussing the mode of spread, important relations of the parapharyngeal space are outlined here (Lederman, 1961).

The parapharyngeal space lies between the cephalic portion of the pharynx and the inner surface of the ascending ramus of the mandible where it is covered by the internal pterygoid muscle. The space can be subdivided into three compartments by the styloid process and its muscles together with the expansions from the carotid sheath.

1. *Prestyloid compartment:* Contents are the internal maxillary artery, and inferior dental, lingual, and auricular temporal nerves. The upper part of this space is related to the lateral wall of the nasopharynx and the fossa of Rosenmuller; the lower part is related to the tonsillar fossa. Tumour tissue reaching this space may spread in the following directions: to the base of the skull where the foramen ovale, foramen spinosum, and the greater wing to the temporal fossa; to the submandibular gland at the floor of the compartment to the parotid gland posterolaterally.

2. *Retrostyloid compartment:* Contents are the carotid sheath and its vessels, the last four cranial nerves, cervical sympathetics, and lymph nodes. Invasion of the compartment is by direct infiltration and by metastasis.

3. *Retropharyngeal compartment:* Unpaired, median in position, separates nasopharynx from prevertebral muscles. Contains lymph nodes of special importance to the lateral-pharyngeal node of Rouvier.

Below are listed the consequence of tumour invasion of:

1. *Prestyloid compartment:* Sensory disturbance of the third division of the fifth cranial nerve (mandibular); trismus from involvement of pterygoid muscles; deviation of the jaw following paralysis of the motor branch of the mandibular; soft palate may be depressed (paralysis of tensor veli palatini); rarely, paralysis of the facial nerve.

2. *Invasion of carotid sheath:* Paralysis of the last four cranial nerves plus cervical sympathetics.

3. *Invasion of retropharyngeal compartment:* Few symptoms unless enlarged nodes there compress the carotid sheath and its contents. Destruction of the lateral mass of the atlas may occur.

Fossa of Rosenmuller is related closely to the internal carotid artery, the Eustachian cushion (with the levator palati), the posterior wall of pharynx and the pharyngobasilar fascia; and the mandibular division of the fifth cranial nerve and the parapharyngeal space. Tumour here may

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spread medially to nasopharynx, nasal fossae, and medial end of Eustachian tube; inferiorly to oropharynx and soft palate; and anteriorly towards the cartilaginous end of Eustachian tube. Cartilage is rarely involved, but tumour may infiltrate through the fascial space surrounding the levator veli palati and extend from the petrous temporal to the soft palate. Involvement of the levator is responsible for persistent deafness though tumour seems controlled by radiotherapy. Infiltration of the middle-ear cleft by the tumour is extremely rare.

Mode of spread

The tumour has been observed to spread either by the invasion of tissues in the pharynx and extension into the parapharyngeal space, thence to the base of the skull and through its foramina into the cranium and its contents. In doing so, muscle, blood vessels, lymphatics, and cranial nerves become involved. Alternatively, the tumour may metastasize to lymph nodes, first in the head and neck, then in a percentage of cases to the lymphatic system elsewhere in the body. Generalized metastasis has been seen. From this behaviour the following three clinical types and their relative frequency may be tabulated:

	No. of cases	*Per cent*
Infiltrative (invasive)	101	47·9
Metastatic	45	21·4
Combination	65	30·7
	211	100·0

A few of the clinical features deserve special mention:

1. *Deafness:* Deafness due to blockage of the Eustachian tube may be the first symptom of nasopharyngeal carcinoma. The blockage may be due to sepsis in the nasopharynx and otitis media; paralysis of the levator veli palatini; blockage by virtue of the size of the tumour; or actual invasion of the tubal orifice. As mentioned above, invasion of the middle ear is extremely rare. Chronic otitis media sometimes needs operative treatment. If surgery follows radiotherapy, healing is poor.

2. *Bleeding:* Blood in the postnasal drip is very significant in the early diagnosis of the disease. Though bleeding is synonymous with ulceration, ulcers may be so small as to be easily missed by clinical examination. Suspicious areas must therefore be biopsied.

3. *Headache and facial pains:* The trigeminal nerve is commonly involved and gives rise to temporal headache, facial pains, hypoesthesia of the face, diminished lacrimation on the side of the disease, and loss of the corneal reflex. The latter could be the first sign of any cranial nerve involvement and should be tested for in every patient. The headache of nasopharyngeal carcinoma may further be due to involvement of the

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meninges. At this late stage, the pain is boring, severe, and indistinguishable from that of meningitis.

4. *Neck nodes:* The nodes first involved are the prevertebral nodes. As they are not palpable, a clinical diagnosis of Stage I (disease confined to the nasopharynx) is often not a pathological Stage I. The first palpable node is in the upper jugular group, deep to the upper fourth of the sternomastoid muscle, at the apex of the posterior triangle. The glands are usually painless. Further involvement of the nodes along the chain is usual; bilateral involvement is seen in approximately one-third of cases.

Distant metastases to lymph nodes are occasionally seen and may be mistaken for diseases like Hodgkin's disease or leukaemia. Involvement of preauricular nodes is rare and may be mistaken for a parotid tumour. However, for cancer cells from the nasopharynx to reach there, the prestyloid space must be traversed; thus additional complications would be evident. *Nodes can appear on the side of the neck contralateral to the side of the primary lesion.* An important point to remember in doing a biopsy.

5. *Cushing's syndrome* (Ch'en, 1956) has been seen in advanced disease. This is, of course, not a feature peculiar to nasopharyngeal carcinoma, but can occur with any advanced carcinoma. In Hong Kong commonest cause of symptomatic dermatomyositis is nasopharyngeal carcinoma. Pseudo myasthenia gravis has also been recorded (McFadzean, 1971).

Method of examination

After a detailed history from the patient, the date of the first symptom related to the nasopharynx is obtained. Oftener than not the history also gives a clue to type, site and extent of the carcinoma. The patient should be sitting upright and the neck must not be twisted. A bright light is imperative. A sucker should be available. Rubber urethral catheters for retraction of the soft palate are sometimes needed. A Lack's angled tongue depressor is essential. A detailed examination is then made of the patient's nose, ears, and throat, which must include the neck and the whole lymphatic system. A neck node may be due to malignancy in the tonsillar area, hypopharynx, tongue, oropharynx, floor of mouth, alveolus, or thyroid. The mediastinum and stomach should also be kept in mind. These areas must all be included in the clinical examination. The most useful method of examination is by a postnasal mirror. Retraction of the soft palate may be required. In patients in whom the pharynx is very sensitive, adequate topical anaesthesia is needed and this can be done by the use of Cetacaine* or a 4 per cent xylocaine spray. This is supplemented if necessary by giving a patient a pellet of Decicain to dissolve in the mouth. To a small group of patients who still gag after prolonged application of a local anaesthetic, atropine may be given additionally to facilitate contact of the anaesthetic with the pharyngeal mucosa. If all these

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measures fail, the patient must be examined under a general anaesthetic. Examination under a general anaesthetic is not a satisfactory procedure for the following reasons: The patient has to be admitted into hospital; the services of the anaesthetist is required; the intratrachael tube gets in the way of the examining instruments.

Large growths (easily detectable) have been seen to occupy the whole of the nasopharynx, extending into the nasal fossae and present even in the oropharynx, displacing the soft palate downwards and immobilizing it. The Eustachian cushions (which form the anterior wall of the fossa of Rosenmuller) can easily escape detection. A biopsy should be done when the disease is suspected.

Supporting evidence may be provided by radiology. For the skull, lateral, submento-occipital, occipito-mental, and occipito-maxillary (25° occipito-frontal) views are of value. These views give the following information: soft tissue swelling in the prevertebral space, obliteration of the lateral pharyngeal recess, and/or bony erosion. Further X-ray pictures of the skeleton may be required if metastasis is suspected. The chest view must always be included in this investigation. Finally, if the hypoglossal nerve is involved and a better view of the apex of the petrous temporal bone is required, bilateral Stenver's (posterior oblique views of the petrous bones) are taken to demonstrate the hypoglossal canal. Stenver's is the only view which shows the canal. Tomography gives even better definition than pictures taken with conventional machines (Ho, 1966).

Procedures used in biopsy include:

1. *Blind technique:* A Tilley-Henkel type of forceps made an inch longer is introduced through the nasal fossa. A large tumour can be easily felt by the forceps and a bite taken.

2. *Forceps and mirror:* The tumour is identified by means of a mirror. The biopsy forceps is then guided into position by an assistant. This is the ideal technique. The nose and nasopharynx must be anaesthetized. Retraction of the soft palate is sometimes required. This is easily done by passing urethral catheters from the nose to the mouth and the two ends held in place by a pair of artery forceps.

3. *Forceps and Yankauer Speculum:* When a small growth is confined to the fossa of Rosenmuller, a pair of forceps introduced through the nasal fossa will not reach it unless it is angled at the tip, but forceps with an angled tip often cannot pass through the nasal fossa. When the patient is too nervous or the gag reflex persists in spite of topical anaesthesia, this procedure has to be done under general anaesthesia. The Yankauer speculum is only useful to visualize the posterior and lateral walls.

4. *Forceps and nasopharyngoscope:* This is a good technique. The forceps can be guided into position while the operator looks through the scope. It is indispensable when trismus is present unless the growth can be seen or felt by means of forceps through the nasal fossa.

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Instruments used include:

1. The postnasal mirror which is ideal because with it one can scan the whole of the postnasal space including the superior surface of the soft palate.

2. The Yankauer speculum which only allows the lateral wall of the nasopharynx and part of the roof and posterior wall to be seen. The choanae and especially the superior margin which can rarely be seen. It is, however, useful for taking a biopsy from the areas that can be seen.

3. The nasopharyngoscope is particularly useful in detecting small lesions and superficial ulcerations (as it gives a magnified view) and to visualize the floor of the lateral pharyngeal recess when mirror examination has not been clear. It is also excellent in directing a biopsy forceps accurately to a diseased site. For its use the nasal fossae and the nasopharynx should first be cocainized with 5 per cent solution of cocaine and adrenaline. The instrument is essential when trismus is present.

Evidence of abnormality in the nasopharynx

Ulcerations, nodular elevations, a smooth bulging of the posterior wall, roof, or the lateral wall extending down to the oropharynx in line with the lateral pharyngeal bands have been observed. The first sign of ulceration may be the presence of blood-tinged pus. Blood clots are highly suggestive of ulceration. Fungating growths commonly occupying the fossa of Rosenmuller, the roof, posterior, or lateral walls are easily seen.

Where to take a biopsy

1. From the tumour itself, when it is large and easily seen. It rarely bleeds severely afterwards.

2. From ulcers, elevated plaques, localized swellings, bleeding areas.

3. From the fossa of Rosenmuller and the adjacent posterior wall and roof of the suspected side (e.g. nodes or cranial nerve involvement). Remember here that neck nodes may appear on the contralateral side of the primary lesion. From the radiotherapeutic point of view it is not essential to obtain information from both sides of the nasopharynx as the usual treatment field is sufficient to cover both sides.

4. A lymph node biopsy is done only when an exhaustive study of the nasopharynx and other relevant areas are negative. Removal of a node as a primary confirmatory diagnostic procedure should never be done for the following reasons: A positive pathological report does not indicate the primary site of malignancy; the tumour bearing area in the node may be missed but a complicating disease like Tuberculosis may be evident instead; removal of a painless node gives the patient false security; a malignant mass in the neck may fungate after interference, thus delaying radiotherapy.

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Nasopharyngeal carcinoma

Treatment

The treatment of nasopharyngeal carcinoma is in the main a radiotherapeutic problem. According to Ho (1971), there are four causes of failure: (1) Failure to eradicate or control the primary tumour by existing methods of radiotherapy, which do not appear to be effective in about one-third of the cases even when the disease appears to be still confined to the nasopharynx; (2) presence of cranial spread with the brain posing a limit to the dose of radiation that could be given without risking fatal or incapacitating radiation neuropathy; (3) distant metastases; (4) uncontrolled cervical nodal metastases, which is the least important of the four now that the radiotherapist has at his disposal megavoltage X-rays or gamma rays from kilocurie telecobalt units and high energy electrons which have enabled him to deliver a cancericidal dose to the cervical nodes without risking radiation myelopathy.

Results

Table I gives the 'four-year results of treatment by stage of 467 nasopharyngeal carcinoma patients with histologically proven primary disease in 1965 (determinate cases). Not included in the analysis were forty indeterminate cases which included four patients with Stage II, ten with Stage III and fifteen with Stage IV disease, who refused or did not return for the proffered treatment, and eleven with Stage III disease who would not complete the prescribed course of radiotherapy. Nine patients with Stage IV disease who would not complete the course because of poor general and local conditions were, however, included in the analysis.' These cases had been seen and treated by Dr. H. C. Ho and his colleagues (Ho, 1971). No discussion of the treatment will be presented here.

TABLE I.
RESULT OF TREATMENT

Stage	No. of cases	Alive	N.E.D.*	Dead	Untraced
I	29 (6·2%)	23 (79·3%)	21 (72·4%)	5 (17·2%)	1 (3·5%)
II	37 (7·9%)	26 (70·3%)	20 (54·1%)	10 (27·0%)	1 (2·7%)
III	243 (52·1%)	90 (37·0%)	68 (28·0%)	134 (55·1%)	19 (7·8%)
IV	128 (27·4%)	18 (14·1%)	12 (9·4%)	103 (80·5%)	7 (5·5%)
V	30 (6·4%)	0	0	30 (100·0%)	0
Total	467 (100·0%)	157 (33·6%)	121 (25·9%)	282 (60·4%)	28 (6·0%)

*Alive with no evidence of disease.

(*Courtesy of Dr. H. C. Ho.*)

When the primary growth does not disappear after a full course of treatment further radiation is sometimes considered. Otherwise intracavitory radiation is employed after a palatal fenestration. As a last resort, oral or intravenous chemotherapy in the form of Endoxan is given. This treatment is only palliatiive and patients are relieved of their

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pain with some regression of growth. Oftener than not the patient is dead within six months of such treatment. Cryosurgery has been used in some centres for recurrent tumour at the primary site. The procedures relieve pain, control sepsis, and bleeding.

Following radiotherapy, the usual complications, such as dryness of the mouth, etc., exists. In years past the skin of Chinese patients was badly blackened by the 250 kv. machines and this was one of the reasons some patients refused treatment. In addition, the following complications have been seen after radiation for nasopharyngeal carcinoma.

Ear: The tympanic membrane becomes white and opaque. Perforation and infection of the ear is common in ulcerated lesions. The external auditory canal skin becomes atrophied, bone becomes exposed, infection and sequestration may take place. The internal ear involvement with giddiness following radiation is not uncommon. High tone loss in hearing has been noted by the author and confirmed by others (Kelemen, 1955; Kelemen, 1963; Leach, 1965). Unfortunately, no histopathological proof in humans has been obtained.

Bone: The cervical vertebrae and the base of skull may show necrosis. The roof of the postnasal space (body of sphenoid) may be necrotic. Sequestration may take place. In the latter condition a foul discharge is present. Frequent cleansing with a modified Proetz technique is required. A palatal fenestration in these cases would greatly help in the toilet and the management of the condition. Trismus, of course, precludes such a procedure unless a sectioning of the ramus of the mandible is done.

Mild myelitis: Lehrmittes sign, a sensation of pins and needles shooting down the body upon flexion of the neck is reversible. Brown-Sequard syndrome or varying degrees of transverse myelitis of the cervical cord is irreversible and leads to quadiplegia. Permanent epilation of areas of the scalp occurs.

Surgical management: The surgeon is required to treat the following conditions: Nasal infections, pre- and post-radiation, post-radiation nasopharyngitis, control of severe haemorrhage, aural complications, trismus, biopsy of neck nodes, endoscopic examination of the broncheal tree and oesophagus, tracheostomy, palatal fenestration.

Summary

Certain pertinent aspects of the anatomy of the nasopharynx and the pathology of nasopharyngeal carcinoma are described.

The clinical findings of 211 personally observed patients with nasopharyngeal carcinoma are presented and are amplified by the experience of certain other colleagues working in Hong Kong. The high frequency of this tumour in Southern Chinese for which there is no satisfactory explanation available is emphasized.

The three major presentations, either alone or in any combination are:

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(*a*) symptoms referrable to the site of the neoplasm; (*b*) involvement of cranial nerves due to infiltration of the foramina at the base of the skull; and (*c*) involvement of the lymphatic system. This last presentation may be remarkably diffused. As is true of other carcinomas certain endocrinological effects may be encountered. In Hong Kong Chinese nasopharyngeal carcinoma is the commonest cause of symptomatic dermatomyositis.

Confirmatory evidence of the existence of the neoplasm may be afforded by radiological investigation but the diagnosis can be established only by adequate examination of the nasopharynx and biopsy. The techniques employed are described in detail. It is emphasized that only on failure of the latter to yield histological evidence of the tumour should recourse to be taken to biopsy of palpable lymph nodes.

The definitive treatment of nasopharyngeal carcinoma is by radiotherapy. Its complications and the part played by a surgeon in its management is described.

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REFERENCES

ALI, M. Y. (1965) *Journal of Anatomy*, **99**, 657.

—— (1967) *Cancer of the Nasopharynx*, p. 138. Ed. by C. S. Muir and K. Shanmugaratam. Munksgaard, Copenhagen.

BAILAR, J. C., III (1967) *Cancer of the Nasopharynx*, p. 101. Ed. by C. S. Muir and K. Shanmugaratam. Munksgaard, Copenhagen.

BELAMARIC, J. (1969) *International Journal of Cancer*, **4**, 560.

CENSUS OF POPULATION (1970).

HONG KONG GOVERNMENT (1961).

CH'EN P'EI-EN (1956) *Chinese Medical Journal*, **74**, 424.

https://doi.org/10.1017/S0022215100078488 Published online by Cambridge University Press

CLIFFORD, P. (1967) *Cancer of the Nasopharynx*, p. 82. Ed. by C. S. Muir and K. Shanmugaratam. Munksgaard, Copenhagen.
DAITO, T., SAKAMOTO, H., and HARA, H. J. (1952) *Archives of Otolaryngology*, **56**, 45.
DAWES, J. D. K., HARKNESS, D. G., MARSHALL, H. F., and VAN MIERT, P. J. (1969) *Journal of Laryngology and Otology*, **83**, 211.
DE-THE, G., HO, H. C., KWAN, K. C., DESGRANGES, C., and FAVRE, M. C. (1970) *International Journal of Cancer*, **6**, 189.
HENLE, W., HENLE, G., HO, H. C., BURTIN, P., CACHIN, Y., CLIFFORD, P., DE SCHRYVER, A., DE-THE, G., DIEHL, V., and KLEIN, G. (1970) *Journal of the National Cancer Institute*, **44**, 225.
HO, H. C. (1967) *Cancer of the Nasopharynx*, p. 58. Ed. by C. S. Muir and K. Shanmugaratam. Munksgaard, Copenhagen.
—— (1967) *Cancer of the Nasopharynx*, p. 238. Ed. by C. S. Muir and K. Shanmugaratam. Munksgaard, Copenhagen.
—— (1971) In *Oncology*, vol. 4, p. 1. Ed. by R. Lee Clark, R. W. Cumley, J. E. McCay, and M. M. Copeland. Year Book Medical Publishers, Chicago.
KELEMEN, G. (1955) *Archives of Otolaryngology*, **61**, 405.
—— (1964) In *Response of the nervous system to ionizing radiation*, p. 127. Little, Brown & Co., Boston.
LEACH, W. (1965) *Journal of Laryngology and Otology*, **79**, 870.
LEDERMAN, M. (1961) *Cancer of the Nasopharynx, Its Natural History and Treatment*. Thomas, Springfield, Illinois.
MCFADZEAN, A. J. S. (1971) Personal communication.
MARTIN, H., and QUAN, S. (1951) *The racial incidence (Chinese) of nasopharyngeal cancer. Annals of Otology, Rhinology and Laryngology*, **60**, 168.
PANG, L. Q. (1959) *Annals of Otology, Rhinology and Laryngology*, **68**, 356.
—— (1960) *Cancer of the nasopharynx*. Hawaii Medical Journal, **19**, 529.
PROETZ., A. W. (1941) *Essays of the Applied Physiology on the Nose*. Annals Publication Co., St. Louis.
—— (1953) *Journal of Laryngology and Otology*, **67**, 1.
STURTON, S. D., WEN, H. L., and STURTEN O. G. (1966) *Cancer*, **19**, 1666.
SVOBODA, D. J., KIRCHNER, F. R., and SHANMUGARATNAM, K. (1967) *Cancer of the Nasopharynx*, p. 163. Ed. by C. S. Muir and K. Shanmugaratam. Munksgaard, Copenhagen.
TEOH, T. B. (1957) *Journal of Pathology and Bacteriology*, **73**, 451.
—— (1971). Personal communications.
—— (1971) *The pathologist and surgical pathology of head and neck tumours*. Unpublished.
VINER, A. S. (1973) Personal communications.
WILSON, C. P. (1957) *Annals of Otology, Rhinology and Laryngology*, **66**, 5.
YEH, S. (1967) *Cancer of the Nasopharynx*, p. 54. Ed. by C. S. Muir and K. Shanmugaratam. Munksgaard, Copenhagen.
—— (1967) *Cancer of the Nasopharynx*, p. 147. Ed. by C. S. Muir and K. Shanmugaratam. Munksgaard, Copenhagen.
ZIPPIN, C., Tekawa, I. S., Bragg, K. U., Watson, D. A., and LINDEN. G. (1962) *Journal of the National Cancer Institute*, **29**, 483.

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