K. J. Lee: Essential Otolaryngology and Head and Neck Surgery (IIIrd Ed)

Chapter 18: Carcinoma of the Oral Cavity and Pharynx

Carcinoma of the Head and Neck

Because of the paucity of well-designed and controlled prospective studies comparing treatment modalities, it is difficult to unequivocally state the ideal therapy for a specific stage of cancer originating in the head and neck. In this chapter I will attempt to present the currently available data which describes the incidence, staging, and the general principles of management of cancer of the oral cavity and pharynx. In addition, data specific to different sites within the oral cavity and pharynx will be discussed. Patients with carcinoma of the head and neck require careful workup and a multidisciplinary approach to their treatment determination and management. This includes the evaluation of radiation oncology, medical oncology, dentistry, social services, and other supporting services as deemed necessary by the head and neck surgeons. Appropriate diagnostic evaluation including CT scan, angiography, and other diagnostic tests are utilized when indicated.

Oral cavity and pharyngeal carcinomas are said to make up approximately 3.25% of all human cancers. They are responsible for 5% of all cancers in males and 2% of all cancers in females. In 1980 3% of all cancer *deaths* in males were from carcinoma of the oral cavity and pharynx and 1% of all cancer deaths in females were from oral cavity cancer. In 1980 there were 25500 new oral cavity and pharyngeal carcinomas and 8800 deaths from carcinoma of the oral cavity and pharynx. It is interesting to note that carcinoma of this region accounts for eight out of 100.000 cancers in the black population in the USA, but only 4.4 per 100.000 in the white population. This represents an 82% higher incidence in blacks. In the USA five out of every 100 cancer deaths in males will be from cancer of this region. In the East and Far East oral and pharyngeal carcinoma account for almost half of all malignant neoplasms. Ninety percent of all carcinomas arising in the oral cavity and pharynx are squamous cell carcinomas. The balance is made up of minor salivary gland tumors and occasional melanomas and sarcomas.

Tumors of this area have been related to tobacco consumption, heavy drinking of alcohol, and particularly with chewing tobacco and the use of betel nut. Sunlight exposure has been particularly related to carcinoma of the lower lip. Poor oral hygiene, mechanical irritation from sharp teeth and the Plummer-Vinson syndrome have been implicated as possible casues of oral cancer.

The presence of leukoplakia of the oral cavity and pharyngeal mucosa has been considered by some as a premalignant lesion. Properly used, however, the term leukoplakia must be considered a clinical diagnosis of a white patch only, and not necessarily a premalignant lesion. Histologic changes such as hyperkeratosis alone can cause this clinical finding. However, an area of leukoplakia may harbor dysplasia, carcinoma in situ, or invasive carcinoma. In one review of 3256 biopsies taken from leukoplakia of the oral cavity, carcinoma in situ or severe dysplasia was observed in 4.5% and invasive carcinoma in 3% (Waldran, C. A., Shafer, W. G.: Cancer 36:1386, 1975). Leukoplakia thus must be considered an area of potential malignancy and should be carefully evaluated and a biopsy taken when indicated.

Anatomic Boundaries and Subdivision of the Oral Cavity and Pharynx

Oral Cavity

The oral cavity extends from the skin vermillion border of the lips to an imaginary horizontal line which can be dropped superiorly from the junction of the hard and soft palate to the circumvallate papillae of the tongue inferiorly. There are eight anatomic subdivisions of the oral cavity. These are:

Lips	Retromolar trigone
Buccal mucosa	Floor of the mouth
Lower alveolus	Hard palate
Upper alveolus	Anterior two-thirds of the tongue.

The lymphatic drainage of the oral cavity primarily is to the jugulodigastric, upper deep cervical, submental, and submandibular nodes. Each anatomic subdivision has a specific drainage pattern.

Pharynx

The pharynx is subdivided into three parts. The nasopharynx, oropharynx, and hypopharynx.

Nasopharynx

The anterior border of the nasopharynx is the nasal choanae, the roof is the sloping skull base which becomes continuous with the posterior pharyngeal wall. The inferior posterior limit is an imaginary line drawn horizontally in the plain of the hard palate. The lateral wall is composed of the torus tubarius, eustachian tube orifice, and fossa of Rosenmüller.

Oropharynx

This region begins anteriorly where the oral cavity stops and extends from the plain of the hard palate superiorly to the plain of the hyoid bone inferiorly. The lateral wall is comprised primarily of the tonsil and tonsillar fossa, its pillars, and the lateral pharyngeal wall. Posteriorly it is bounded by the pharyngeal wall mucosa which extends from the superior to inferior limits described above. Subdivisions of the oropharynx include: (1) tongue base including pharyngoepiglottic folds and vallecula, (2) faucial arch including the soft palate and anterior tonsillar pillar, (3) tonsil and tonsillar fossa, (4) pharyngeal wall which includes the posterior tonsil pillar, the lateral and posterior pharyngeal walls.

Hypopharynx

This portion of the pharynx extends from the plain of the hyoid bone above to the plain of the lower border of the cricoid cartilage below. It does not include the larynx and has three parts: (1) the pyriform sinus, (2) the postcricoid area, and (3) the posterior pharyngeal wall.

The lymphatic drainage from the pharynx is into the jugulodigastric, jugulomohyoid, upper deep cervical, and retro-pharyngeal nodes.

TNM Staging (AJC 1980)

Oral Cavity

Tx: Tumor not accessible by the rule.
T0: No evidence of primary tumor.
Tis: Carcinoma in situ.
T1: Tumor 2 cm or less.
T2: Tumor more than 2 cm but less than 4 cm.
T3: Tumor greater than 4 cm.
T4: Tumor greater than 4 cm which also involves deep invasion of the antrum, pterygoid muscles, tongue base, or skin of the neck.

Nasopharynx

Tis: Carcinoma in situ.
T1: Tumor confined to one site.
T2: Tumor involving two site.
T3: Tumor extension into nasal cavity or oropharynx.
T4: Tumor invasion of skull and/or cranial nerve involvement.

Oropharynx

Tx: Tumor not accessible by the rule.
T0: No evidence of primary tumor.
Tis: Carcinoma in situ.
T1: Tumor 2 cm or less.
T2: Tumor more than 2 cm but less than 4 cm.
T3: Tumor greater than 4 cm.
T4: Tumor greater than 4 cm which also involves deep invasion of the antrum, pterygoid muscles, tongue base, or skin of the neck.

Hypopharynx

Tis: Carcinoma in situ.
T1: Tumor confined to site of origin.
T2: Tumor extension to adjacent region or site without fixation of the larynx.
T3: Same as T2 but with fixation of larynx.
T4: Massive tumor invading bone or soft tissue of neck.

Staging (see Fig. 18.1)

Stage I: T1N0
Stage II: T2N0
Stage III: Includes T3N0 or T1T2T3 and N1.

Stage IV: Includes all other TN classes not included above.

Neck Node Staging (see Fig. 18-2).

General Principles

It is important to remember that head and neck cancer is a multisystem disease. These patients have a previous history of heavy alcohol intake with resultant liver disease, chronic obstructive pulmonary disease from abuse of tobacco, nutritional depletion as a result of the tumor and other personal hygiene deficits, and have a generalized immune suppression as a result of the neoplasm, alcoholism, nutritional suppression, or all three. Careful endoscopy under general anesthesia with mapping and careful recording of the lesion using the written word and with a drawing is indicated. Esophagoscopy is carried out along with laryngoscopy during evaluation of the oral cavity and pharynx. This is done as there is a 9-10% incidence of synchronous primary tumors occurring at the same time as the presenting cancer. Bronchoscopy generally is not as productive as a chest x-ray in defining a second primary and, as such, is not mandatory. In the oral cavity the lesions are tattoed using india ink. This will facilitate later surgical attack, particularly when cytoreduction occurs as a result of adjuvant chemotherapy or radiation therapy. Neither the liver-spleen scan nor bone scan has been found to be of diagnostic value in most patients with head and neck cancer. Consultations are obtained with medical oncology, radiation therapy, and other consulting services as indicated. It should be noted that chemotherapy, at the present time, is still unproved as a therapeutic modality in the primary treatment for head and neck cancer and, as such, its use should be restricted to new head and neck cancer patients in the protocol setting. A general rule as to prognosis is that as one proceeds anatomically from the lips posteriorly to the hypopharynx the prognosis gets poorer.

As far as general principles of treatment are concerned it can be said for the oral cavity that for T1 and T2 lesions either radiation therapy or surgery will handle the tumor with equal effectiveness. For advanced lesions either surgery alone or combination therapy using either pre- or postoperative radiation is acceptable. These are general treatment principles, however, and there are many arguments which have been put forth favoring surgery, radiation therapy, or combinations thereof. Each patient must be individually evaluated and the therapy based on the skills of the radiation therapist, the surgeon, and what the patient can tolerate.

Management of neck metastasis when clinically present, in most cases requires surgery. There are many advocates, however, who have pointed out that neck nodes less than 2 cm can be controlled 80-85% of the time by radiation therapy alkone (Wisenberg et al: Cancer 29:1455, 1972; Million: Cancer 34:149, 1974, and Weller et al: Am J Roentgenol 126:236, 1976). These therapists also point out that the N0 neck can be controlled in 85-90% of cases by radiation therapy alone. Most surgeons and many radiation therapists, however, recommend neck dissection either alone or in combination with radiation therapy for clinically positive nodes. The clinically negative neck is another story. There has been considerable discussion and debate over whether or not elective neck dissection is of value. In general, it has been stated that if the incidence of occult metastases in the neck is higher than 25-30%, an elective neck dissection is indicated. Other advocates would say, however, that if radiation therapy is being used to treat the primary cancer, occult metastasis in the neck also can be

controlled with radiation therapy. There are many reports which state the incidence of occult metastasis to the neck. These generally have been used on cases in which a clinically negative neck was treated surgically and subsequent pathologic evaluation demonstrated positive microscopic or clinically nonpalpable nodes to be present in a neck dissection specimen. These percentages vary depending on whose series you read, but generally they are all reasonably close in incidence. For the oral cavity, Jesse et al reported the following (Am J Surg 120:505, 1970):

Site	Occult Nodes (%)
Oral tongue (N=121)	34
Floor of the mouth (N=123)	30
Buccal mucosa (N=95)	9
Lower gum (N=48)	19

Ogura reported the following incidence of occult metastasis for these pharyngeal sites (Ann Otol Rhinol Laryngol 80:646, 1971):

Site	Occult Nodes (%)
Pyriform sinus (N=98)	38
Base of tongue (N=34)	22
Posterior pharyngeal wall (N=6)	0

In a study reported by this author in the Archives of Otolaryngology, December 1981, a 10% incidence of occult metastasis was noted for carcinoma of the tonsil. It should be noted that the occult metastasis is not to be confused with those patients presenting with clinically palpable lymph nodes. Spiro and Strong (Clin Bull 6:3, 1976) in a review of admission lymph node status for oral cavity carcinoma at Memorial Hospital, noted the following:

With Palpable Nodes at Admission

Site	(%)
Floor of the mouth (N=804)	39
Tonsil (N=650)	61
Tongue	
Base (N=136)	76
Oral (N=314)	31
Palate	
Hard (N=123)	15
Soft (N=299)	37
Buccal mucosa (N=248)	36
Alveolus (N=179)	35.

However, it should be noted that for tumors arising in the hypopharynx, metastasis to the neck at the time of presentation occurs in about 70% of the patients. Contralateral disease has been noted by a number of authors to occur in 10% of cases at presentation. For the

nasopharynx, localized presentations with disease confined to the site of origin is relatively unusual occurring in only about 25% of the cases. Regional metastases are frequently the presenting sign of nasopharyngeal carcinoma, and regional disease occurs in at least 50% of patients who present with nasopharyngeal carcinoma. In this group of patients, however, distant metastases occur frequently and should be searched for. Lederman, in 1961, in his textbook Cancer of the Nasopharynx, reviewed 150 cases of nasopharyngeal carcinoma and found the frequency of metastasis to be as follows:

Jugulodigastric nodes	70%
Upper deep cervical nodes	66%
Jugulo-omohyoid nodes	34%
Spinal accessory nodes	28%
Inferior cervical nodes	20%.

It should be noted that the jugulodigastic node is the most common site of lymphatic metastasis from the nasopharynx to the neck. At the same time, the most common site of squamous cell carcinoma that metastasizes to the posterior triangle is the nasopharynx.

With this information we can now evaluate the value of elective neck dissection. Arguments against it include the following:

1. Radical neck dissection results in a significant morbidity.

2. Many unnecessary operation are performed.

3. Cure rates are no worse if one waits for occult disease to become palpable.

4. Radiation therapy effectively controls occul metastasis.

Arguments for elective neck dissection would include:

1. A high incidence of occult disease in the N0 neck.

2. Waiting may result in increased distant metastases.

3. Many patients are not responsible in their follow-up and are placed in greater jeopardy of later metastases by not being treated promptly.

4. If the primarily tumor is being treated surgically and the neck must be entered to treat it, then an elective neck dissection should be done at the same time.

It is clear then, if an elective neck dissection shows positive nodes the survival is better than in the patient who presents with a clinically positive neck. Spiro (Arch Surg 107:382, 1973) noted a 26% 5-year cure rate in those patients who had elective neck dissection with positive nodes, and 18.9% 5-year determinant cure in those who presented with a clinically positive neck requiring a therapeutic neck dissection. This retrospective analysis was statistically evaluated and felt to be of borderline significance. It is well known, however, that the presence of cervical node metastasis significantly reduces survival. This

study and other studies are flawed by the fact by the fact that they are retrospective studies rather than prospective studies. Another retrospective study, somewhat better designed since retrospective site and age-matched controls were used is that reported by Stell (Proc R Soc Med 68:83, 1975). In this group of patients with T1 to T4 oropharynx, hypopharynx, and laryngeal carcinomas, Stell evaluated those patients who had an elective neck dissection (32 patients) and compared them to 32 matched patients who did not have an elective neck dissection and who did not receive neck treatment until they developed positive cervical nodes. I will refer to this as the "wait-and-see" approach. At 3 years he noted that the elective neck dissection group (32 patients) had an absolute survival of 35% whereas in the wait-and-see group the survival was 57%. He looked at neck recurrence, primary recurrence, distant metastasis, and intercurrent disease and found no difference in the two groups. This was statistically analyzed and found to be significant at a value less than 0.02. Another study which we cannot ingore is that by Vandenbrouck and colleagues (Cancer 6:386, 1980). This was a prospective randomized study of patients with T1, T2, and T3N0 oral cavity lesions. They were randomized into two treatment groups: those receiving elective neck dissection and those with a wait-and-see approach, receiving neck dissection only after neck metastasis presented. They found a life table survival rate of 78% in the elective neck dissection group and 75% in the wait-and-see group. They also found that the incidence of neck recurrence, primary recurrence, distant metastasis, and intercurrent disease were similar for both groups. This prospective study was statistically analyzed and it was found that there was no difference between the two groups. This is a most important study of the type of which we need more in evaluating the treatment of head and neck cancer patients. It would seem to indicate that a wait-and-see attitude in the patients presenting T1, T2 and T3N0 oral cavity cancer is just as effective as elective neck dissection. Based on this information, then, it is this author's recommendation that elective neck dissection be done when all of the following criteria are present: (1) a greater than 25% occult disease is likely; (2) no radiation therapy is to be used to treat the primary disease, and (3) poor patient follow-up is expected. Furthermore, modified neck dissection should be considered for these patients.

Specific Sites of Oral Cavity and Pharynx

Carcinoma of the Lip

Carcinoma of the lip accounts for 25-30% of all cancers of the oral cavity. Lip cancer constitutes approximately 0.6% of all human cancers. The lower lip is the site most frequently involved (95%); the upper lip and commissure being responsible for the other 5% of lip cancer. This disease is most common in patients 50-70 years old, and there is distinct male preponderance (95%). Lip cancer has been associated with a fair complexion, with exposure to sunlight, with pipe smoking, and with the predisposing condition of actinic cheilitis - a skin disorder due to exposure to sun, wind, and rain. Eighty-five percent of lip cancers arise halfway between the midline and the commissure of the lower lip. Although the upper lip is an infrequent site for cancer, the 5-year survival for carcinoma originating at this site is significantly reduced compared to the lower lip. Because these cancers are so obvious, usually they are diagnosed early and neck metastasis is relatively infrequent, occurring in only 5-10% of patients at the time of diagnosis. Almost all lip cancers are squamous cell and these account for 98-99% of all carcinomas involving the lip. Other neoplasms that occur in this area include basal cell carcinoma, keratoacanthoma, and minor salivary gland tumors. Although neck node metastases are relatively uncommon, as the size of the lesion increases,

the frequency of neck metastases also increases.

In most cases the treatment of carcinoma of the lip has been surgical excision. Radiotherapy, however, also has been successful in the management of lip carcinoma. The overall survival is excellent and 80-90% 5-year cure rates have been reported for carcinoma of the lower lip. Carcinoma of the upper lip, however, has been associated with a 50% regional metastasis rate and 5-year survivals of 40-50%.

As far as surgery is concerned there are numerous operations described for lip cancer. However, two operations, either wedge excision or a rotation flap, will successfully manage 90% of all lip cancers. Important principles to remember are that up to 30% of the lip can be excised without significant deformity and that the normal commissure should be preserved if at all possible. Marking the vermillion border with a microdot of india ink is valuable in closure. Elective neck dissection is not indicated in lip cancer.

Although not described here, the otolaryngologist/head and neck surgeon should be familiar with the lip shave and vermillion advancement, the Abbe-Estlander operation, the Bernard's reconstruction, the Burrow's operation, and how to correct the rounded commissure.

Carcinoma of the Buccal Mucosa

Buccal carcinomas occur in patients of more advanced age than do those of other oral cavity sites. The mean age for buccal carcinomas is in the seventh decade. Buccal carcinoma also occurs more frequently in men than women except in certain areas of the southeast where snuff dipping and tobacco chewing is as frequent in women as in men. In India where cancers of the oral cavity represent one of the most frequent sites of cancer in the body, buccal mucosal carcinomas are particularly frequent. In India and the Far East these have been associated with the chewing of betel nut.

The most common site of origin of buccal carcinomas is that part of the mucosa lying against the lower third molar. It also has been stated, in the past, that carcinomas arising in the posterior buccal mucosa do less well than those with anterior lesions. Krause was not able to substantiate this finding in his review of carcinoma of the oral cavity.

Although these cancers are in fairly obvious sites in the oral cavity, they frequently present as advanced tumors with trismus or neck metastis as the first clinical sign. Although several authors have stated that lymph node metastasis is relatively unusual, Krause et al (Arch Otolaryngol 97: 64, 1973) and Dhawan (Surg Gynecol Obstet 137:31, 1973) found that lymph node metastasis occurred in 37-58% of the cases.

An important distinction to be made histologically is that verrucous carcinomas do occur on the buccal mucosa. However, this should be distinguished from exophytic invasive squamous cell carcinoma. The latter is more common than the verrucous carcinoma. Kraus and Perez-Mesa (Cancer 19:26, 1966) described 77 oral cavity verrucous carcinomas, 50 of which originated on the buccal mucosa. It is interesting to note that 13 of their verrucous carcinomas were treated by radiation therapy and all 13 recurred. Squamous papillomas and pseudoepitheliomatous hyperplasia are in the differential diagnosis of buccal carcinoma.

Both surgery and radiation therapy have been advocated as the treatment of choice for buccal carcinomas. In the case of verrucous carcinoma, it appears that surgery is the preferred treatment modality. For invasive squamous carcinoma 5-year survivals have been reported to range from 40-70% depending on the stage of disease. Krause, in comparing surgery, radiation, and combination therapy, found the highest survival in his surgically treated group. However, it is important to note that this surgery group had a much lower incidence of regional metastasis than the radiation- or combination-therapy-treated groups. Once again, it is difficult to present data from the literature which specifically proves surgery or radiation therapy to be superior one to the other. The choice of therapy must be based on the size of the lesion and the presence or absence of regional metastasis, and the level of surgical and radiation therapy skills that are available.

Carcinoma of the Floor of the Mouth

The floor of the mouth is the U-shaped area situated between the lower alveolus and the tongue. Excluding the lips, carcinoma of the floor of the mouth is the second most common site of squamous cell carcinoma in the oral cavity. It is said to account for 10-15% of all oral carcinomas and is the most common intraoral site of carcinoma in the black population. The disease is preponderant in males, and in Krause's series there was a 4:1 male/female ratio. The usual association with tobacco and alcohol use has been noted. Lymph node metastasis is fairly common with the submandibular triangle being the earliest area of involvement. Because of the more common anterior location of these carcinomas the frequency of bilateral lymphatic metastasis is not uncommon. In Krause's series four of 21 patients with T3 lesions had bilateral lymph node metastasis. For small lesions Spiro and Strong reported they were able to control 80% of those lesions 4 cm or less in diameter. For more advanced lesions, Krause and co-workers found combination therapy to give improved survival over surgery or radiation therapy alone. The general principles of therapy discussed earlier (surgery or radiation for early lesions and combination for advanced lesions) seems to hold for the floor of the mouth, as well as other sites in the oral cavity.

It is important to note the frequency of multifocal squamous carcinomas occurring in patients who present with carcinoma of the floor of the mouth, buccal mucosa, and soft palate and, as such, careful examination of the upper aerodigestive tract for a synchronous secondary primary lesion is required.

Carcinoma of the Alveolus

Carcinomas of the alveolus are more frequent in the lower jaw than the upper jaw and generally are noted to arise more commonly over the premolar regions. Alveolar carcinoma is more common in areas where tobacco chewing is frequent. It is important to differentiate carcinomas of the maxillary sinus breaking through the palate and involving the alveolus from those primarily originating on the upper alveolus. Sinus x-rays are indicated to rule out this possibility for any alveolar or hard palate carcinoma. It has been noted that bone invasion occurs in approximately 50% of all cases of squamous cell carcinoma of the alveolus (Whitehouse: Clin Otolaryn 1:45, 1976).

Metastasis from the alveolus occurs most frequently to the submandibular area. The incidence of lymph node metastasis for carcinoma of the dental alveolus is approximately

35%.

Survival rates in alveolar carcinoma are in the range of 50% 5-year survival. There has been no difference between the upper and lower jaw. Lymph node metastasis at this site, as well as other sites in the oral cavity, considerably lowers the 5-year survival rates to 35% or below.

Surgical therapy is generally recommended for lesions in the T1 or T2 category. Larger lesions may well require combination therapy. If the tumor is ulcerated and involves secondary infection we find resection followed by radiation therapy to be preferable to preoperative radiotherapy.

Carcinoma of the Palate

It is important to note that the hard palate is part of the oral cavity and the soft palate is part of the oropharynx. Perhaps the reason for this is the fact that squamous cell carcinoma of the hard palate is relatively rare. New and Hallburg (Surg Gynecol Obstr 73:520, 1921), in reviewing 5000 cases of cancer of the oral cavity, observed only 25 squamous cell carcinomas of the hard palate. Since this early report the same finding has been noted by many investigators. It has been estimated that for every squamous cell carcinoma of the hard palate there are three or four salivary gland tumors that occur at this site.

Carcinoma of the palate occurs most frequently in the elderly male, and again prognosis is related to tumor size and nodal status. Regional lymph node metastases occur in approximately 50% of the cases. Because they are geographically separated an en bloc resection is not feasible and the neck metastasis must be handled separately from the primary disease itself.

Carcinoma of the Anterior Tongue and Tongue Base

Although the tongue base is located in the oropharynx it will be included in this section to allow consideration of the entire tongue at one time.

The anterior two-thirds of the tongue is the site of two-thirds of all tongue cancers. The other one-third arise in the tongue base. Seventy-five percent of anterior tongue lesions are T2 or smaller, whereas at the tongue base less than 5% of all cancers are T1. Tongue base lesions most frequently present as advanced lesions diagnosed because a neck mass, severe odynophagia, or otalgia has finally led to an examination of the tongue.

The tongue base is associated with clinically palpable neck metastases at presentation in 75% of cases. For carcinomas arising on the anterior two-thirds of the tongue about 33% of these patients will have palpable neck metastases. Metastasis in T1 anterior two-thirds lesions is quite low although Krause et al have pointed out that there is a significant incidence of occult metastases (30%) and avocated treatment of the neck.

The majority of tongue base cancers have clinically positive metastases at presentation. Those that are clinically negative will have a high incidence of occult metastases.

T1 lesions of the anterior tongue can be handled effectively with intraoral excision. Primary closure or a skin graft over the defect will result in a minimal functional deficit. An equally effective treatment would be radiotherapy. However, the length of treatment may make surgery more expeditious. Since occult metastasis is fairly frequent, these patients require careful observation since any neck metastasis that subsequently occurs will require prompt treatment. Combination therapy for all other tongue cancers should be considered.

Tongue base cancers which are T1 can be treated with radiation therapy to achieve the maximum therapeutic benefit with minimal functional deficit. More advanced lesions, when determined to be operable, are best managed by a combined approach of surgery and radiation therapy. The larynx must be sacrificed if it is involved. If not, the tongue base can be resected en bloc with a neck dissection and the tongue base deficit reconstructed with a myocutaneous or other suitable flap to preserve speech and deglutition.

Carcinoma of the Oropharynx

It is important to note that with the revised AJC staging system (1977) the soft palate and tongue base were reclassified as a region of the oropharynx and removed from the oral cavity. The anatomic limits and subdivisions of the oropharynx have been described above.

The majority of malignancies of the oropharynx are squamous cell carcinomas. Less frequent histologies include lymphomas, minor salivary gland malignancies, or the rare melanoma or sarcoma. Today, the histologic terms "transitional cell carcinoma or lymphoepithelioma" are considered to be squamous cell carcinomas of poor differentiation. These histologic variations each account for about 15% of squamous cell carcinomas. Of all upper respiratory tract neoplasms squamous cell carcinoma of the tonsil is second in frequency only to carcinoma of the larynx, according for approximately 12000 new cases a year.

Cure rates for oropharyngeal carcinomas as a group have been somewhat poor. This is attributed to the frequency of metastasis and of advanced local disease at the time of diagnosis. The rate of regional metastasis varies from 40% for the soft palate to 70% for the tongue base. Because of rich lymphatic drainage of this region bilateral metastasis is not unusual. The retropharyngeal nodes are an important depository for metastatic cells and, although the jugulodigastric nodes are the clinically positive nodes more frequently found, the retropharyngeal nodes must be considered in treatment planning. Ballantyne (Am J Surg 108:500, 1964) reported metastases to the retropharyngeal nodes in 44% of pharyngeal wall cancers.

Cure rates for squamous cell carcinomas of the soft palate are in the 50% range as they are more frequently diagnosed early than carcinoma of the tonsil, where the overall cure rate is in the range of 35% (Givens et al: Arch Otolaryngol 107:730, 1981). Jesse and Sugarbaker (Am J Surg 132:435, 1976) assessed the reason for treatment failure (inadequate resection or radiation failure) to be the most important cause of failure. This was followed by regional recurrence. Approximately 10% of their patients failed because of distant metastases. Perhaps more important is the observation by Givens et al who found that, in their series of cancers of the tonsil, 21% of 113 patients died of a noncancerous intercurrent disease within 5 years - often after good control of their tonsil carcinoma had been obtained. They

also noted that 27% of their patients developed a second primary cancer whereas Jesse and Sugarbaker found 37% of their patients developed a second primary lesion.

No single treatment has gained popularity. Physicans advocate surgery alone, radical radiation, or combined therapy. A review of the literature would suggest radiation therapy is the treatment of choice in stage I and II disease (Fletcher GH: Head and Neck Surg 1:441, 1979; Doyle PJ et al: Otolaryngol 7:189, 1978). Because of the significant incidence of occult cervical metastasis (Barrs et al: Arch Otolaryngol 105:479, 1979; Sako et al: Surg Gynecol Obstet 118:989, 1964) even in early-staged disease, the radiation field should include the primary lesion and the neck as well.

For stage III and IV operable carcinomas, combination therapy with high-dose preoperative radiation therapy (4500-5000 rad) appears to offer increased local and regional control rates over single treatment modalities (Hamberger and Fletcher: Radiology 119:433, 1976; Doyle PJ et al: Otolaryngol 7:189, 1978; Edstrom S et al: Laryngoscope 88: 1019, 1978).

It is clear that the frequent failure of the above-mentioned treatment plans indicates the need to explore the benefits of adjuvant or systemic therapy.

Methods of surgical approaches with which to be familiar include:

1. Intraoral excision.

2. Resection through mandibular osteotomy.

3. Midline translingual pharyngotomy.

4. Extended lateral pharyngotomy.

5. Transhyoid pharyngotomy.

6. Mandibular swing.

7. Standard composite resection.

Carcinoma of the Hypopharynx

This anatomic region when involved by cancer does not give rise to symptoms until late in the course of the disease. As a result of this fact and the high incidence of metastasis early in the course of the disease, survival rates for carcinoma of the hypopharynx are perhaps the lowest of all sites in the head and neck.

Almost all malignancies arising in this region are squamous cell carcinomas. A history of excess use of tobacco or alcohol is commonly associated with these malignancies. The Plummer-Vinson syndrome, characterized clinically by achlorhydria, sideropenic anemia, and atrophy of the mucous membranes of the mouth, pharynx, and esophagus, is frequently associated with carcinoma of the hypopharynx, oral cavity, or esophagus in women (Ahlborn

H.E.: Br Med J 2:331, 1936).

The pyriform sinus is the most frequently involved site in the hypopharynx. Postcricoid and posterior hypopharyngeal wall carcinomas account for only one-third of hypopharyngeal cancers.

Cervical node metastasis is frequent, occurring in 70% of pyriform sinus lesions, 40% of postcricoid carcinomas, and 50% of posterior hypopharyngeal wall lesions (Bryce D.P.: In: Cancer of the Head and Neck. Conley J (ed), 1967, pp 341-346; Truluck and Putney: Arch Otolaryngol 93:271, 1971).

The most frequently proposed therapy for these tumors has been laryngopharyngectomy and a neck dissection. When the postcricoid or cervical esophagus is involved a partial esophagectomy is also necessary. Radiation therapy as a solitary treatment modality has been used only for the very small lesions. Radiation therapy has had its use in this group of tumors as an adjuvant therapy. Its best use has been in high doses since low-dose therapy (less than 4000 rad) seems to offer little benefit over surgery alone (Shah et al Am J Surg 132:439, 1976). The use of high-dose preoperative radiotherapy was encouraging (Bryce D.P.: Can Med Assoc J 93:1147, 1965) but the report by Eisbach and Krause (Laryngoscope 87:1904, 1977) was discouraging in that they found that patients treated with high-dose preoperative radiation did no better than those treated by surgery alone. They interpreted their data as indicating that preoperative radiation reduced the tumor size but, in doing so, distorted the apparent extent of disease. They proposed that this resulted in inadequate surgical excision. Their findings have been supported by Martin and co-workers (Cancer 46:1974, 1980) and by Donald and colleagues (Otolaryngol Head Neck Surg 88:738, 1980). These authors suggest that radiation therapy is of value, but that it is best employed postoperatively after adequate resection of the carcinoma without distortion by preoperative radiation therapy. Donald et al in a small group of patients with carcinoma of the pyriform sinus, reported a 28% survival in patients receiving preoperative high-dose radiation, but a 64% survival in patients receiving postoperative radiation.

Postcricoid carcinoma seems to carry the worst prognosis of all hypopharyngeal sites (Som M and Nussbaum M: Otolaryngol Clin N Am 2:631, 1969). Som felt these lesions were best managed by surgery. Problems with managing disease at this site include skip areas along the esophagus and involvement of mediastinal nodes. Since the defect is significant, reconstruction with tubed pedicle flaps or gastric pull-up is indicated.

Posterior pharyngeal wall carcinomas can be surgically resected providing they are not fixed to the prevertebral fascia. Sometimes, this is a difficult clinical distinction to make. Five-year cure rates of 21% have been quoted by Cunningham and Cathen (Cancer 20:1859, 1967). For cancers confined to the posterolateral wall an extended lateral pharyngectomy with primary closure and postoperative radiation therapy has been successfully employed.

Carcinoma of the Nasopharynx

Carcinoma of the nasopharynx is one of the more interesting sites to study in the head and neck region. Cancers at this site have been noted to have a genetic predisposition, particularly in the Chinese where the HLA-A2 and HLA-8-sin2 antigens are associated with

cancer at this site (Ho JHC: Int J Radiol Oncol Biol Phys 4:181, 1978). The joint occurrence of these two antigens in a patient increases the risk of the subsequent development of nasopharyngeal carcinoma. In the non-Chinese population it has been suggested that an antigen at the A3 locus might be associated with increased incidence.

Antibodies to Epstein-Baww virus (EBV) has been well established in nasopharyngeal carcinomas. This association extends beyond ethnic boundaries. The unanswered question is whether or not the virus is related to the etiology of this cancer. The use of IgG and IgA antibodies to EBV have been useful to monitor the course of the disease. IgA antibodies to the EBV-viral capsid antigen appear to be the most sensitive marker (Matthews et al: Otolaryngol Head Neck Surg 88:52, 1980).

In the USA nasopharyngeal carcinoma ranks 33rd in prevalence of malignant tumors in males, while in Singapore it ranks first (Muir CS: JAMA 220:393, 1972). In China and Hong Kong this disease has a peak incidence between 45-55 years of age. In non-Oriental patients the disease is bimodal in presentation with a significant prevalence (18%) in patients under age 30, as well as its prevalence later in life. (Deutsch M et al: Cancer 41:1128, 1978).

The WHO has defined three histologic classes of nasopharyngeal carcinomas. These are: (1) undifferentiated carcinoma, (2) nonkeratinizing carcinoma, and (3) squamous cell carcinoma. The undifferentiated carcinomas may be divided into lymphoepitheliomas and lymphopenic types. When lymphocytes occur in a carcinoma of the nasopharynx it is important to realize that they are not neoplastic. They can be found in all three histologic types but most frequently appear with the undifferentiated type. (Batsakis JG: Head Neck Surg 3:511, 1981). The lymphoepithelioma appears to be more sensitive to radiation therapy.

These carcinomas originate most frequently in the posterolateral wall of the nasopharynx. The position of this tumor along the skull base allows for spread by direct infiltration. One particularly devastating direction is through the foramen lacerum to involve the middle cranial fossa and cavernous sinus where cranial nerves III, IV, V, and VI can become involved. The V cranial nerve is the most frequently involved. Metastasis to the cervical lymph nodes is the common presenting symptom in nasopharyngeal carcinoma. Other symptoms of nasopharyngeal carcinoma include epistaxis, hearing loss as a result of eustachian tube obstruction, and facial and head pain.

The treatment of choice for all nasopharyngeal carcinomas is radiation. Surgery is impractical because of the inaccessibility to this region. Bloc resection of the nasopharynx is not practical at the present time. Radical neck dissection is of value to control residual neck nodes if the primary lesion is controlled by radiation therapy. Fortunately, radiation therapy appears to be reasonably effective in controlling this cancer. Five-year survival rates, when combining all states of the disease, are in the 35-40% range (Choa G: In: Cancer of the Head and Neck. Suen JY and Myers EN (eds) 1981 pp 409-411).