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Complications in Neck Dissection 10 years experience with 268 cases in the Cancer Institute

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Although neck dissection is common operation for the metastasis of head and neck tumors, there is very little written about it in current medical literature.

Lymphatic drainage of the head and neck is due to the rich Lymphatic chain, which lies in the neck. To remove this chain the neck dissection covers the fowllowing anatomical site.

Medially it is mid-line, superiorly it is the horizontal branch of the mandible, on the lateral side the levator scapula muscle and below being the clavicule.

The lymph nodes lie mostly in the fat around the internal jugular vein. To be able to remove all the lymphatics, the sterno-cleido-mastoid muscle, the internal jugular vein and the sub-maxillary gland should be removed en-bloc, in the aforementioned frame. of course, at times when the primary is close to the neck and the removal of the primary tumor is in a one block dissection with the neck nodes, some other anatomical organs should be removed, in addition to those previously mentioned. As one would do when performing a commando operation, part of the maxilla would be removed with the specimen. Another example would be as in the cancer of the thyroid, when the prethyroid muscles would be removed along with the thyroid, nodes and other organs.

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Complications arising when one performs these operations are divided into two categories:-

1. Complications during Surgery, (immediate).
2. Post operative complications, (delayed).

1. Complications During Surgery.

(a) If there were a deviation of trachea, due to a tumor or the neck nodes, difficulty in breathing may occur. This may cause hypoxia, which is sometimes followed by a cardiac arrest whilst the patient were being put into the operative position. (same being the rotation of the head, and the extension of the neck), at the commencement of the operation. If such a situation should develop, tracheastomy should be performed immediately. However, at times it would be impossible even to start the anaesthesia and insert the endo-tracheal tube; in which case a tracheastomy with local anaesthesia would be mandatory to prevent the aforementioned complication.

(b) Severe Hemorrhage.

Circumstances may be such that during surgery, severe hemorrhage could be caused by the rupture of the carotid artery or of the rupture of the base of one of its branches. This, however, is a very rare complication, which can be prevented by careful dissection of the neck.

It may also occur that the jugular vein would rupture during surgery, in which case, the hemorhage would be severe. This however, could be clamped easily when in the specimen; but there still remains the fact that the jugular vein could rupture during ligature in the lower, or, in the upper neck. In which case, the vein might tend to pull back and it would, under these circumstances be very difficult to find the vein and perform a ligature on it. To prevent this complication, the vein must be handled with great care; pulling of the specimen, or of the vein itself, is one of the main causes of this complication. When ligating, the vein should be ligated at least one centimetre from the base. The ligature to be used, should be of silk. It must be remembered that it would not be feasible to use very fine silk for the purpose of ligatures, as there would always be the possibility of the silk cutting into the vein. At each end of the vein, two ligatures should be used.

When rupture occurs in the jugular vein a sucking sound can be heard. This indicates that air is being sucked into the nervous system. If the rupture is within reach, it should be clamped immediately, if, however, the rupture cannot be easily reached; primarily, the area should be packed with oxycell and pressing mesh. A dressing should be applied to cover the rupture and the patient should be turned onto his side, with his head down.

(c) Carotid Sinus Complex.

Sometimes during Neck Dissection when one is working on the carotid artery, especially when one is dissecting the bifurcation away from the surrounding tissues, a sudden drop in blood pressure may occur. The surgeon should always exert caution for this cataclysm, and when reaching the bifurcation of the carotid artery, should inform the anaesthesiologist of the current situation. The sudden hypotension which occurs, is due to the stimulation of the chemoreceptors which are located at the bifurcation of the carotid artery.

To prevent this, the surgeon must exert extreme caution whilst performing on the carotid artery. Some surgeons inject %I xylocaine under the connective tissue covering the carotid artery at the bifurcation. It would seem, that this manoeuvre prevents the stimulation of the chemoreceptors at the bifurcation, consequently, most of the time whilst one were working in this area the blood pressure would not change.

(d) Nerve Injury

Another catastrophe that may occur during surgery, is that of nerve injury. At times, one would select to cut a particular nerve, due to the involvement of that nerve with the tumor. However, at times, one may injure a nerve accidentally.

The significant nerves in the operative field are as follows:- Hypoglossal, phrenic, vagus, accessory spinal, recurrent laryngeal, brachial plexus and glossopharyngeal.

Any injuries caused to the above mentioned nerves, may create problems post operatively, but with carefull dissection, these injuries can be easily prevented.

The brachial plexus and glossopharyngeal nerves are practically un-

reachable during a major operation, and would rarely be susceptible to injury.

The spinal accessory nerve is usually part of the dissection, and it is routinely severed. Some surgeons do belive in sparing this nerve when there are a few node metastasis of the thyroid carcinoma.

(e) Leakage of Chyle

Leakage of Chyle may occur during surgery. This can either come from the lymphatic channels in the neck or, from the thoracic duct itself. When leakage occurs, the thoracic duct should be ligated immediately.

It is good practise to clamp the tissue before cutting, thus eliminating this complication.

(f) Perforation of the Pleura.

The perforation of the pleura may occur whilst one is working at the base of the neck under the clavicule. If this does occur, the opening should be closed immediately, and the anaesthesiologist should be informed, and directed to inflate the lungs before the surgeon closes the opening. The resulting pneumothorax should then be treated by placing a small chest tube in position, to aspirate the air.

2. Post Operative Complications.

(a) Suffocation.

Suffocation may occur immediately, post operatively, in the recovery room, or in the bed, due to laryngeal edema, or, pressure on the trachea because of a hemorrhage at the site of the operation.

Tracheostomy set should be at the bed side post operatively.

(b) Infection.

Infection is a complication which can occur following almost any operation. However, the possibility of infection is far greater in the combined operations, as in Commando, Laryngectomy with neck dissection and Laryngopharyngectomy with neck dissection.

To prevent infection, the wound must be washed at the end of the operation with saline or some other antiseptic solution. Large doses of the antibiotics should also be administered post operatively.

(c) Sloughing of the Flaps.

Sloughing may occur in some cases, at the edges of the skin, especially if the patient has been subjected to radiation in the neck pre operatively.

Infection is another cause of this occurence.

Different incisions are suggested for the prevention of this complication, as shown in figures (I), (II) and (III).

(d) Leakage of Chyle.

Leakage of Chyle is a troublesome complication. Conservative treatment being suggested for same. The dressings should be changed few times daily, (usually, re-entering the wound does not help in these cases).

Because of the resulting hypoproteinemia with this complication, the patient should be given a sufficient quota of daily proteins.

(e) Late Hemorrhage.

This is one of the fatal complications of Neck Dissection. Late hemorrhage usually occurs on the sixth or seventh post operative day, the source of bleeding being the carotid artery, or one of it's main branches. Generally, late hemorrhage occurs in an infected wound. The bleeding in such a case is so severe that in entering the patient's room, the catastrophe is obvious, the bed, floor, the walls, and sometimes, even the ceiling may be stained with blood.

In the Head and Neck Departments, where these operations are carried out routinely, the staff are trained to face this problem when it occurs. Such measures as applying pressure to the bleeding point, starting immediate transfusions of blood in the extremities, giving oxygen to the patient and taking the patient to the operating room, (where a team of trained staff are ready to operate), are the main points, when treating such patients.

To prevent this dreadful complication, a flap of levator scapula muscle is raised and placed over the carotid artery by some surgeons, as is shown in figure, V, IV. It is believed by some surgeons that this procedure does prevent to some extent the perforation of the carotid artery, post operatively.

The second prophylactic measure, is to fight the infection, when it is present, one should be watchful of this complication.

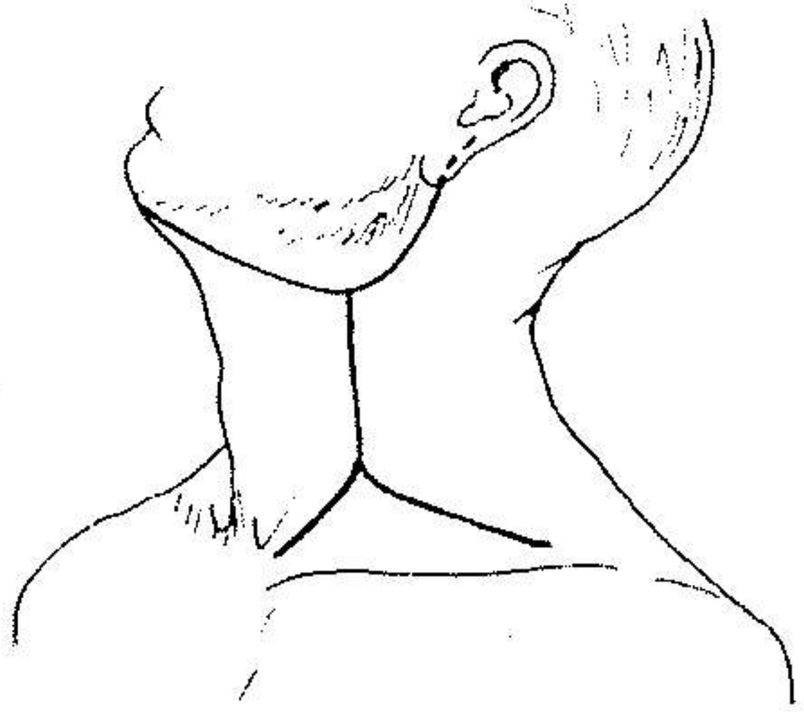

FIG. I.

Classical incision for radical Neck Dissection. Good exposure.

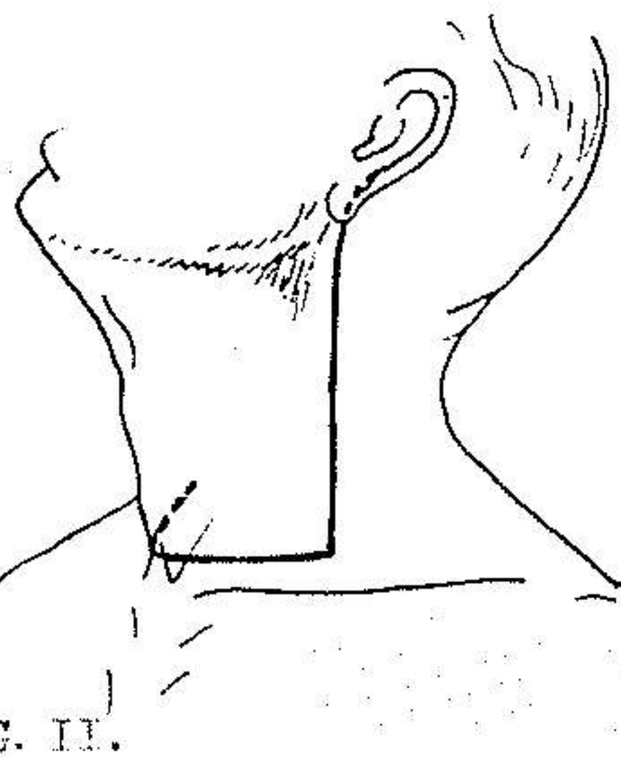

FIG. II.

Incision for Thyroidectomy with Neck Dissection - better cosmetic results.

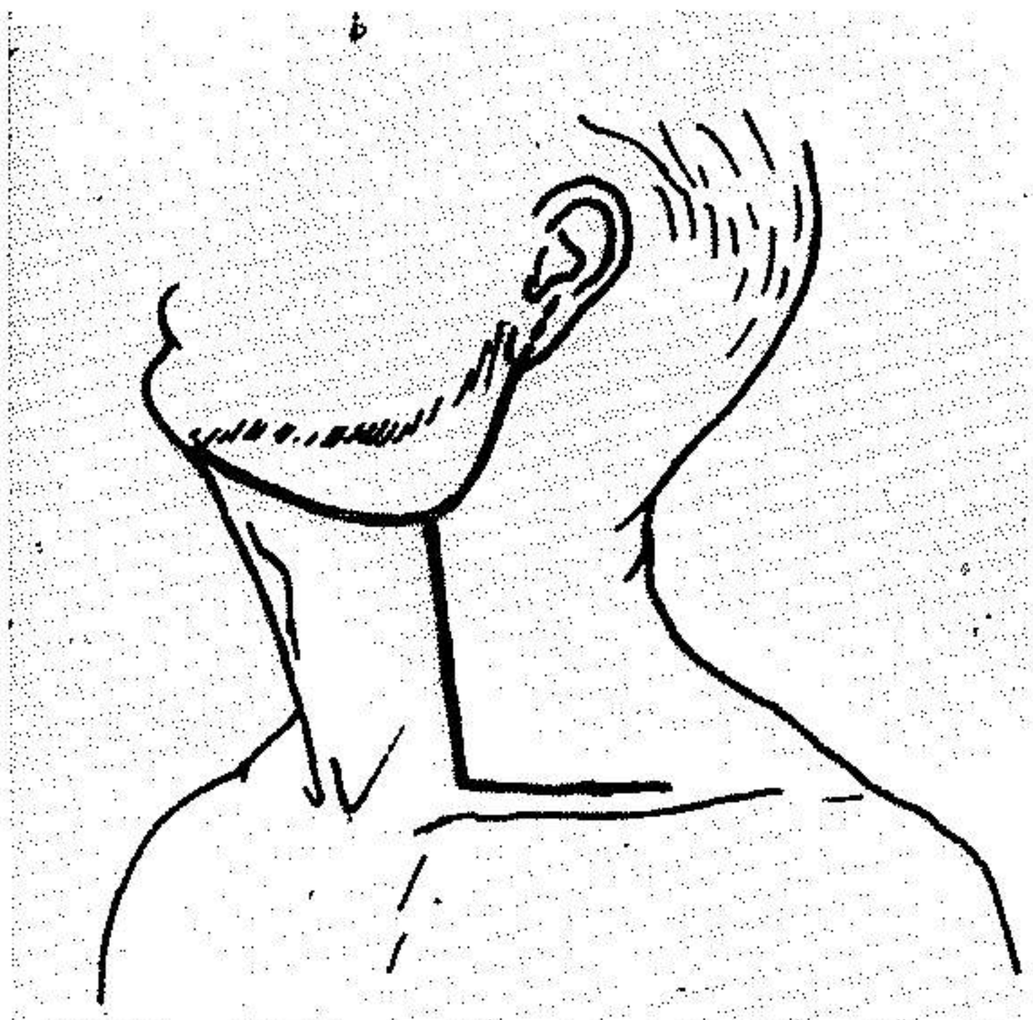

FIG. III.

Incision for Neck Dissection (modified).

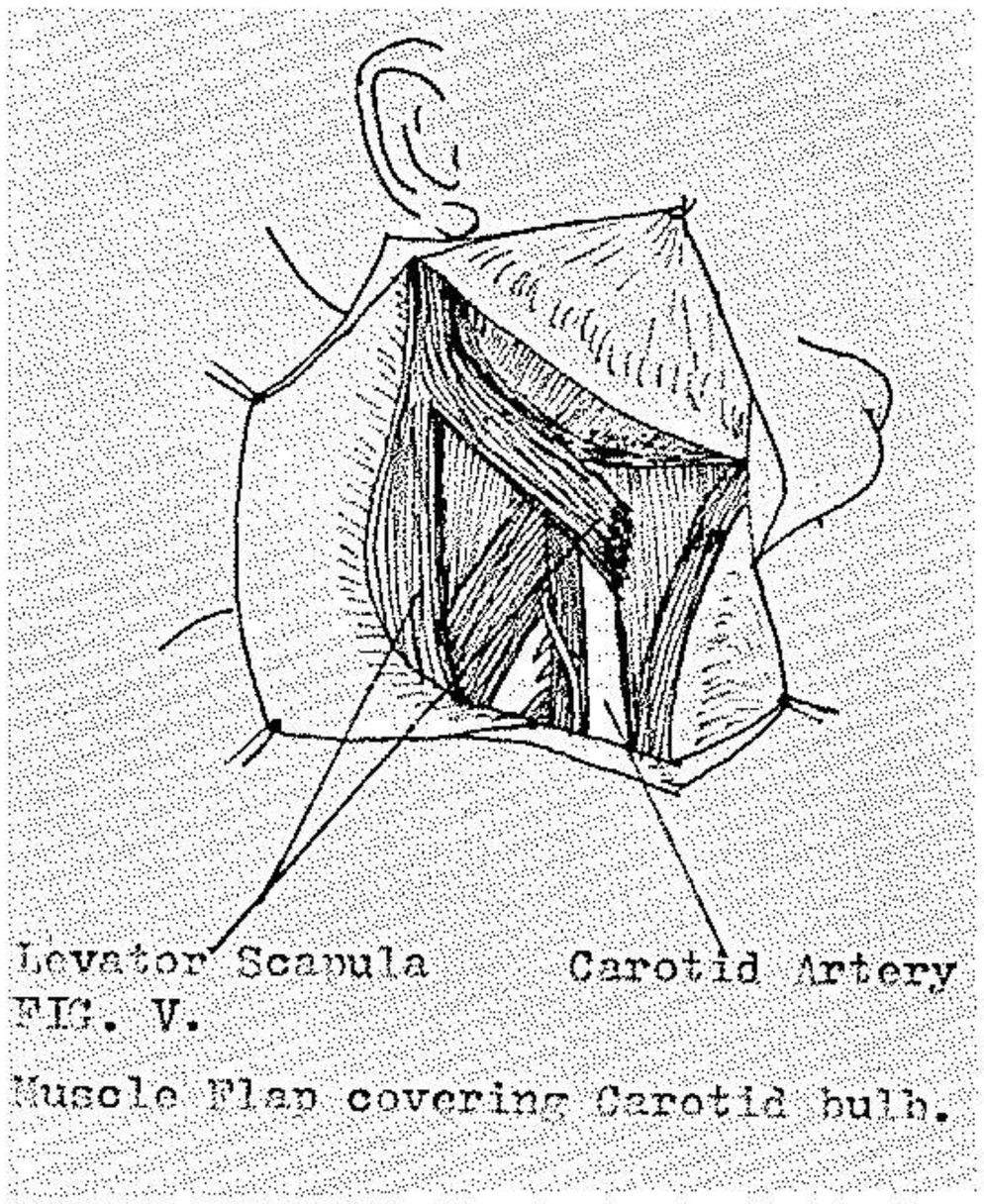

FIG. V.
Muscle Flap covering Carotid bulb.

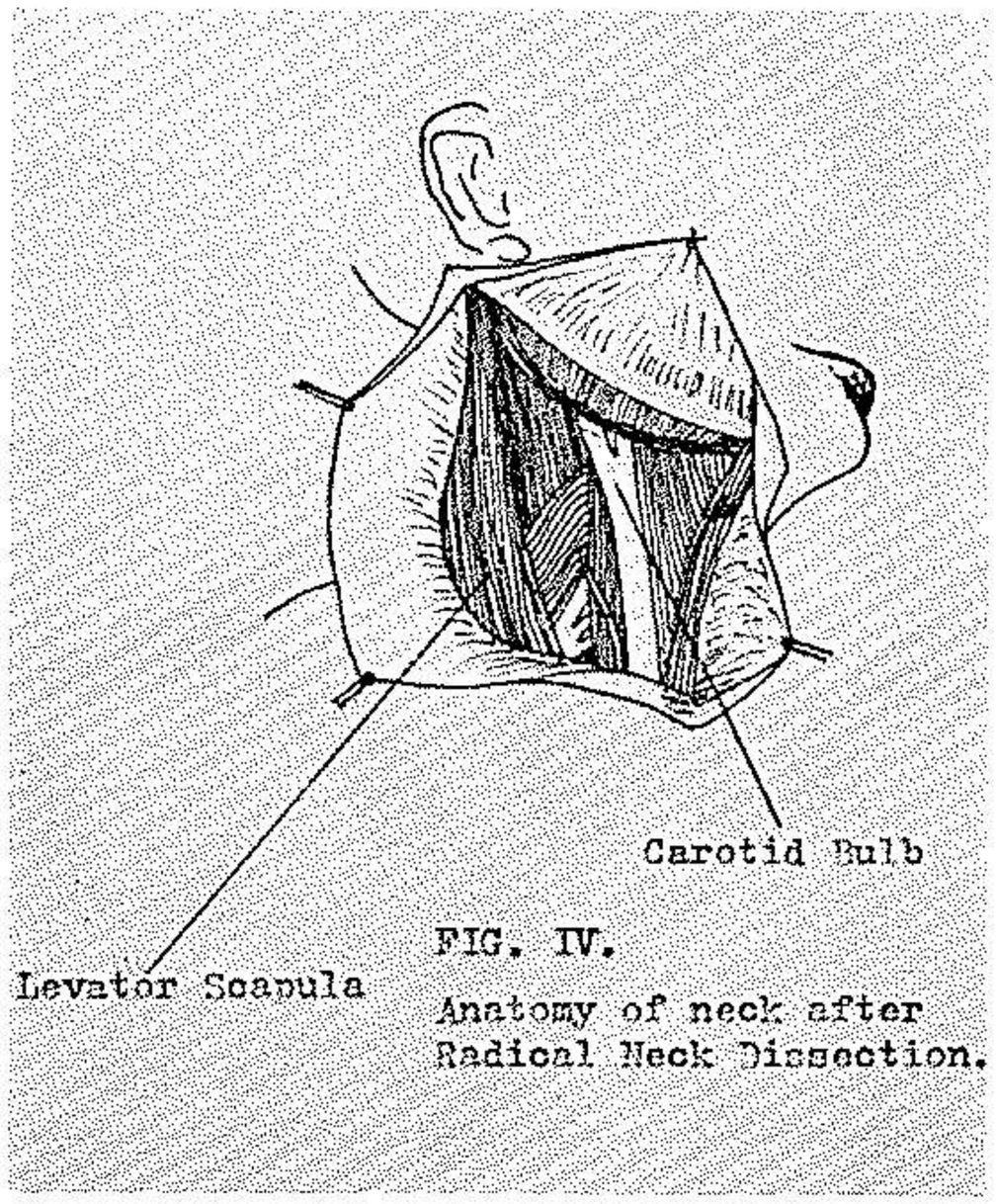

FIG. IV.
Anatomy of neck after
Radical Neck Dissection.

The review of 268 cases of neck dissections in the Cancer Institute of Tehran University in the past 10 years (1963-1973) has yeilded the followings:

The male ratio to female was 1:1.45 (table I) the reason for it being that most of the N.DS were for metastatic nodes of thyroid carcinoma.

Average age of the patients was 45, the youngest being 22 and the oldest 68 years of age.

There were no death due to N.Ds.

The complications in accordance to the article on hand were as follows:

Comlications during surgery (table II)

It is our routine in the cancer institute to severe the spinal accessory nerve in the N.Ds., Only in few cases we have spared the nerve and those have been the cases of metastatic nodes of thyroid carcinoma limited to the lower neck.

Leakage of chyle was noticed during operation in one case and was ligated immediately.

Neck Dissections

Table I

Sex	N. D. for metastasis	P.N.D.	
Male	107	2	109
Female	156	3	159
Total	263	5	268

* In 5 cases of carcinoma of the Tongue prophylactic Neck Dissection was performed.

Complications During Surgery

Table II

	Male	Female	Total	
Urgent Tracheostomy	2	1	3	
Server Hemorrhage	—	—	—	
Carotid Sinus Complex	1	3	4	
Nerve Injury	—	—	—	
Leakage of Chyle	1	—	1	
Perforation of Pleura	—	—	—	

Post Operative Complications (table III)

Infection was seen in 12 cases and almost in all cases it was due to combined opeations as Commando opeation or Laryngectomy with N.D.

We had two cases of hematoma post operatively but they were due to venous hemorrhage and were not arterial. It is interesting that we did not have any case of perforation of carotid artery post operatively which is an unfortunate and known accident in the centers doing numerous N.Ds.

Post Operative Complications

Table III

	Male	Female	Total
Suffocation Necessitating Urgent Tracheostomy	1	1	2
Infection	7	5	12
Sloughing of the Flaps	3	4	7
Leakage of chyle	—	2	2
Late Hemorrhage	—	2	2
Edema of Face	1	2	3

Leakage of chyle was seen in two cases and in both cases ligation was attempted on the 4th. day. In one case we were able to find an accessory duct and the ligation was successful, but in the other case leakage continued for sometime and subsided gradually.

Edema of the face was seen in three cases and all have been due to simultaneous bilateral N.Ds. We perform bilateral N.Ds. Only in cases of advanced thyroid carcinoma with bilateral metastasis in the neck nodes.

Our procedure is radical N.D. in the side which has more nodes clinically and modified N.D. in the opposite side preserving internal jugular vein.

The distribution of the origin of the neck node metastasis is shown in **table IV**. Thyroid carcinoma dominating the other cancers of head and neck.

The percentage of thyroid carcinoma in the Cancer Institute is much higher than the International standards. and almost all of them are advanced cases with node metastasis. As is known the node metastasis of thyroid carcinoma are mostly operable. But this is not true with the other cancers of the head and neck. Most of the cancers are advanced cases when they come to the Cancer Institute and when nodes are present in the neck they

are mostly inoperable cases and the patients are treated with other means of therapy as radio-therapy or Chemotherapy or combination of both.

Distribution of the origin of 263 cases of node metastasis in the neck for which neck dissections have been performed

Table IV

	Lip	Tongue	Larynx	Parotid	Gingiva & Buccal Mucosa	Skin	Origin Unknown	Total
Male	8	15	8	2	1	6	2	107
Female	4	12	5	2	3	3	1	156
Total	12	27	13	4	4	9	3	263

	Thyroid
Male	65
Female	126
Total	191

Summary

Immediate and late post operative complications of radical Neck Dissection were discussed. Preventive measures and the treatment of each were mentioned briefly.

Our 10 years experience with complications of neck dissection in the Cancer Institute was presented.

Resumé

Lés complication immédiates et lointaines du courage ganglionaire du cou sont exposés et lés méthodes sommairement expliqeés.

L'auteur presents sés éxperiences sur le courage ganglionair du cou et lés complication de cet operation a L'Institute Cancer.

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