

ORIGINAL RESEARCH

LYMPH NODE INVOLVEMENT IN UPPER AERODIGESTIVE TRACT CANCERS A CLINICAL STUDY AT SPECIALTIES UNIVERSITY HOSPITAL OF RABAT

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ABSTRACT

Introduction: Cervical lymph node involvement has a major impact on prognosis and treatment decisions in patients with upper aerodigestive tract (UADT) cancer.

Objective: The aim of this study was to assess the incidence and pattern of cervical lymph node (LN) metastases in cancers of the upper aerodigestive tract

Methods: This prospective study was conducted by the Department of ENT and Maxillofacial Surgery at Specialties University Hospital of Rabat, collecting data between October 2009 and December 2011. Lymph nodes were counted, clinically and radiologically localized, excised, then studied histologically.

Results: During this period, 106 patients have been treated surgically with a recent diagnosis of UADT cancer. The average age of our patients was 55 ± 13.3 years, while male/female ratio was 3.5 to 1. More than half of our patients were operated with cancer of the larynx (58.5%, n=62); 27.4% (n=29) of patients suffered from oral cavity cancer and 14.2% (n=15) had cancer of the hypopharynx. Cervical lymph node invasion was estimated at 31.2% clinically, and 38.7% radiologically and histologically, distributed in different sites.

Although the percentage of the invasion is almost similar clinically, radiologically and histologically, the high number of false positives and true negatives according to clinical and radiological exams confirms that specificity and sensitivity of these two exams is still poor compared to histology.

Conclusion: Thus, cervical metastases have to be diagnosed histologically. Moreover, the low percentage of lymph node invasions in the case of a UADT cancer suggests that the use of sentinel lymph node technique could be important, as it has been validated for small T1T2N0 tumors in the oral cavity. Further studies are needed to confirm its validity in case of other UADT tumor types.

Keywords: UADT cancer, lymph node invasion, clinical, radiology, histology.

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INTRODUCTION:

The most important prognostic factor in upper aerodigestive tract (UADT) cancers is the presence of cervical lymph node metastases (1, 2). Thus, the

oncological status of the neck is important for TNM staging (3). There are several prognostic factors, such as the number of positive nodes (1, 2, 4), the size of the nodes (1, 4), extracapsular extension (1, 4, 5), or the presence of

nodes on several levels of the neck (1, 6). Lymph node invasion can be assessed by clinical examination, imaging (ultrasound, computed tomography or positron emission imaging) or anatomopathological analysis of cervical lymphadenectomy with different incidences. Many studies have shown that a histological analysis of the excised nodes alone is capable to determine the true metastatic state of lymph nodes.

The aim of our study is to compare clinical, radiological and histological incidence of lymph node invasions in upper aerodigestive tract cancers, and to question the indication of prophylactic neck dissection in the treatment of cancer.

MATERIALS AND METHODS

This prospective study lead by the Department of ENT of the Specialty Hospital of Rabat was performed between October 2009 and December 2011. We performed 192 neck dissections in 106 patients who underwent surgery because of a newly diagnosed UADT cancer. Patients with sinus cancer and cancer of nasopharynx were excluded. Cervical nodes were identified, clinically and radiologically localized, excised then histologically studied.

Inclusion criteria: All patients, who were newly diagnosed with a UADT cancer in any location; received a head and neck CT ; received primary surgical treatment consisting of excision and prophylactic neck dissection ; and were treated in the Department of ENT and Maxillofacial Surgery in the Specialty Hospital of Rabat.

Exclusion criteria: All patients, who had unresectable tumor due to size or location; refused surgery; suffered from a cancer that does not need dissection (purely glottic carcinomas); and were not assessed by a CT.

RESULTS

106 patients were included with an average age of 55 13.3 years (extremes 16 to 84). Male predominance was clearly observed with a male:female ratio of 3.5 to 1. 50.9% of our patients were smokers. Only one patient was referred with an isolated cervical lymph node that appeared without other warning signs.

A clear predominance of laryngeal cancer was found in 59% of all cases. 27% of patients suffered from oral cavity cancer, while hypopharyngeal cancers were present in 14% of cases. During the studied period no case of cancer of oropharynx occurred.

Histologically, 99.1% of our patients suffered from squamous cell carcinoma, one patient had type II myxoid liposarcoma. Cancer stages were found as follows: no cases of T1, 16% of T2, 57% of T3 and 26.4% of T4.

Lymph node state

Table 1 shows the number of clinically invaded nodes. Clinically node invasion was found in 31.2% of the cases, while the result of radiology and histology was 38.7%, distributed in different sites of the neck (table 2). Metastatic nodes presented with a capsular invasion in 56.4% of cases. Lymphatic embolism was present in 47.7% of cases.

Therapeutical characteristics

In all cases the tumor was treated surgically. 20 patients received unilateral dissection, while in the rest of the cases dissection was bilateral. Types of performed dissection are listed in Table 1. The post-operative recovery was uneventful in 70% of cases. Complications types seen after surgery are detailed in table 1.

Table 1: Dissections characteristics

	N	%
0	72	67.9
1	17	1.6
2	13	12.3
3	2	1.9
+4	2	1.9
Number of clinically invaded nodes		
Functional	101	95.3
Radical	4	3.7
Modified radical	1	0.9
Type of performed dissection		
Surgical site infection	9	8.5
Pharyngostoma	16	15.1
Mediastinitis due to broken suture	2	1.8
Thoracic duct injury	3	2.8
Perioperative death	2	1.8
Uneventful recovery	68	70
Surgical site infection	9	8.5
Complication types		

Table 2: Percentage of invaded nodes per levels

	Clinically	Radiologically	Histologically
Ia	0.45%	2.84%	0.9%
Ib	4.25%	4.7%	3.75%
IIa	18.4%	33.5%	13.65%
IIb	0.45%	14.15%	0%
III	4.25%	32.05%	2.35%
IV	4.25%	28.8%	0.45%
V	0%	0%	0%
VI	0%	0%	1.9%

DISCUSSION

Epidemiology

Our study with its average age (55 years) and male predominance, even with the increased prevalence of female patients (24 F/82 M), corresponds to the literature(7-10), where the mean ages are 55.8 to 62, and the youngest patient had 17, and the oldest had 89.

34.9% of our patients did not have alcohol or tobacco dependence, which can be explained by the high number of women who smoke and drink less.

In our series, the most common cancer location was found in the larynx, followed by oral cavity and hypopharynx. This order is in line with the literature (7).

Most patients were initially seen for dyspnea witch needed tracheotomy. This is due to the high number of laryngeal cancers (62 out of 106), and mostly because of the advanced T3 and T4 stage cancers at the time of the consultation.

Histology

Clinical detection of cervical node metastases by palpation is limited (11, 12).

With around 20% of misdiagnoses due to false positives or false negatives, ultrasound seems to be the best imaging method to detect cervical node metastases, compared to computed tomography, magnetic resonance imaging and positron emission imaging (14). As a rule, lymph node micrometastases (< 10 mm) cannot be detected with imaging.

Thus, anatomopathological analysis of cervical lymph node dissection is the reference method to diagnose cervical node metastases (13-16).

Our series revealed that the lymph node invasion was 32.1% clinically, 38.7% radiologically and 38.7% histologically. This makes us think that the sensitivity of clinical examination and imaging is the same as that of histology when diagnosing cervical node metastases in UADT cancers.

When we analyzed the data, we found that clinical or radiological true positives are not positive in histology, while the contrary is true. This confirmed that clinical detection of cervical node metastases by palpation is limited and that lymph node micrometastases (< 10 mm) are not detectable with imaging.

Average number of analyzed nodes

The average number of analyzed nodes in our study -31- is considerably higher than the number required by the International Union Against Cancer (UICC) for histopathologic classification of excised lymph nodes (pN). According to the UICC, for a histological exam a total of 6 excised nodes are needed in case of selective dissection, while 10 in case of radical or modified radical dissection. According to other series, the average number of excised lymph nodes varies between 14 and 50 for selective dissections, and between 26 and 67 for radical and modified radical dissections, which perfectly matches with the average number found in our series.

Comparison of histological node invasion in the oral cavity

In cases of oral cavity cancer, like in all UADT cancers, lymphocytosis in our series is still low compared with data found in the literature.

Table 3: Comparison of percentages (%) of invaded nodes in different levels (cancers of the oral cavity).

	Benlyazid et al. (9)	F. Jegoux et al. (17)	Our series
Ia	4.3%	26.9	3.4%
Ib	13%		13.75%
IIa	78.3%	53.8%	3.45%
IIb	26%		0%
III	30.4%	30.7%	0%
IV	4.3%	11.5%	0%
V	N/A	3.8%	0%

Comparison of histological node invasion in the hypopharynx

Although only slightly, but percentage of node invasion in hypopharyngeal cancers is higher in level II, which corresponds perfectly to the literature.

Table 4: Comparison of percentages (%) of invaded nodes in different levels (hypopharyngeal cancers)

	Z. Oueslati et al. (10)				IGR(18)	Our series
	TE	SP	RCA	PP		
I	0	0	0	0	1	0
II	50	81.1	73.5	73	74	13.35
III					59	0
IV	50	5.6	17.6	7.3	42	0
V	0	11.1	0	0	13	3.8

Comparison of histological node invasion in the larynx

Results vary from series to series but node invasion within level IIa is generally predominant.

Table 5: Comparison of percentages (%) of invaded nodes in different levels (laryngeal cancers).

	Hahn SS (19)	Mnejja M (8)	Our series
I	8	N/A	N/A
I		N/A	N/A
IIa	22	7	18.55
IIb		2.4	0
III	29	4.2	4.05
IV	41	2.7	0
V	0	0	0

Lymph node invasion and capsular invasion

According to Frédéric Michel et al. (7), percentage of invasion is 3.5% (151/4287) for lymph node micrometastases, and 48% (184/385) for lymph node macrometastases. Among the pN+ nodes, percentage of capsular break is 45% (68/151) for lymph node micrometastases and 82% (144/175) for lymph node macrometastases smaller than 30 mm.

In our series, the size of node metastases was not specified, thus global percentage of histological node invasion was 38.7% with approximately 21.7% of capsular invasion.

Invaded nodes' impact on the prognosis

Lymph node invasion detected after a neck dissection for carcinoma in the oral cavity or oropharynx is a negative prognostic factor for the overall survival. Woolgar et al. (20) followed 123 patients with squamous cell carcinoma of the oral cavity and the oropharynx treated by surgical excision and neck dissection. Even though in lower rate, they found that survival at five years dropped if lymph node involvement was confirmed (44% vs. 86%).

However, they have not analyzed the epidemiological data of the studied population depending on the number of involved nodes and have not studied the rate of local and regional control. Kalnins et al. (21) also found this correlation between the degree of lymph node invasion and the survival rate at five years in patients who suffered from oral cavity carcinoma and treated only with surgery. On the other hand, in their paper published more than 20 years ago, the rate of local and regional control and the disease-free survival rate were not calculated when analyzing the patients according to the lymph node invasion. They suggested an adjuvant treatment for patients who have more than 2 invaded nodes based on the occurrence of metastases found on autopsies patients suffering from cancer with high risk of recurrence. Shingaki et al. (22) did not find correlation between the number of invaded nodes and the survival rate at five years. However, their analysis only focused on 61 cases of oral cavity cancer.

CONCLUSION

Neck dissection in UADT cancers is an effective method not only to diagnose metastatic invasion, but also serves as a preventive treatment against lymph node recurrence.

Our study could confirm that this type of invasion can only be detected histologically, as it is suggested in the literature. Moreover, low percentage of lymph node invasions located in specific levels (IIa for pharyngolaryngeal cancers, Ib for cancers of the oral cavity) and negative results in certain levels (IIb and V) questions the validity of selective dissection during treatment of UADT cancers.

ABBREVIATION

CT: Computed Tomography.

ENT: Ear, Nose and Throat.

IGR: Institut Gustave Roussy

IUAC: International Union Against Cancer.

LN: Lymph Node.

TNM: Tumor, lymph Nodes, and Metastasis.

UADT: Upper AeroDigestive Tract.

SOURCE OF SUPPORT:

Declared none.

COMPETING INTERESTS

The authors declare no competing interests.

AUTHORS' CONTRIBUTIONS

The participation of each author corresponds to the criteria of authorship and contributorship emphasized in the [Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals](#) of the [International Committee of Medical Journal Editors](#). Indeed, all the authors have actively participated in the redaction, the revision of the manuscript and provided approval for this final revised version.

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