# EARLY OUTCOMES ASSESSMENT OF TONSIL CANCER TREATMENT BY IMRT TECHNIQUE

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ABSTRACT

***Introduction:*** *In this study, the authors present the results in the application of IMRT technique for tonsil cancer at Hue Central Hospital.*

***Materials and methods:*** *Prospective study on 31 patients with tonsil cancer from March 2015 to May 2016 by IMRT technique. Mean age was 62.32 ± 14.31 years old (range: 40-92 years old), 80.6% were male.*

***Results:*** *The follow-up time was 3 months for surviving patients. The predominant T and N stage were T3 (90.3%), N1 (58.1%) and N2 (25,8%). Good and moderate histological differentiation of the tumors accounted for 81.7%. Complete response rates of the primary tumor and the nodal disease were 96.8% and 93.5%, respectively. Grade 3 mucositis occurred in 32.3% of patients. Xerostomia grade 2 was recorded in 67.7% of the patients.*

***Conclusions:*** *The results indicate that IMRT technique provides satisfactory results and should be applied in treatment of tonsil cancer.*

***Key words:*** *IMRT technique, tonsil cancer*

## I. INTRODUCTION

Radiotherapy on patients with squamous carcinoma of the tonsils has a high rate of success. [4]

Patients with tonsil cancer or other head and neck cancer need extensive radiotherapy, which lead to multiple side effects, especially concerning prolonged, extremely irritating dry mouth. Dry mouth is not only a disturbing side effect of radiotherapy, but it may also cause serious troubles in nutrition, dentistry, infections and social-psychological fields. In the worst case, dry mouth could lead to gangrene of the lower jaw, a rare but lethal complication if lower jaw bone is decomposed. [2]

**IMRT technology**

The invention of IMRT technology has significantly reduced the issue of dry mouth. It is widely accepted that the most important organs for the production of saliva are the two parotid glands, which are affected by current technology in radiotherapy. With IMRT, the radiation dose received by parotid glands can be reduced by 50-75%. Meanwhile, the dose of radiation asorbed by the tumors and lymp nodes will be simillar or higher that of normal radiation therapy. These will lead to good results in the preservation to some extend the normal fuctions of at least one parotid gland, which is enough for keeping the mouth moist [2].

Currently, IMRT is a real revolution in the treatment of cancer and should be indicated for most head and neck cancers. There are cases that IMRT is a must, like nasalpharyngeal and typical tonsil cancer [2].

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Since 3/2015, at Radiotherapy department, Oncology center, Hue Central Hospital, IMRT technique has been used with a certain degree of success. However, there has not been a full asset of the result of using this technique.

Therefore, we conduct the study "**Early outcomes assessment of tonsil cancer treatment bt IMRT technique**" with 2 following objectives:

-Research the clinical and sub-clinical characteristics of tonsil cancer

-Assess early results of using IMRT technique in tonsil cancer treatment

## II. MATERIALS AND METHODS

### 2.1. Materials

Between 3/2015-5/2016, we have treated 31 tonsil cancer patients using IMRT at Radiotherapy department, Oncology center, Hue Central hospital.

***Patients selection criteria:***

Patients diagnosed with squamous carcinoma of the tonsils by means of clinical examination, imaging diagnosis (CT, MRI, PET, ultrasound), sub-laryngeal endoscopy and histopathology.

TNM classification (according to UICC): T1-T3, N0-N2, M0

Liver and kidney fuction: normal

***Exception:***

Patients don't fit the criteria.

### 2.2. Methods

A descriptive prospective study.

***Study's size:***

All patients eligible for this study

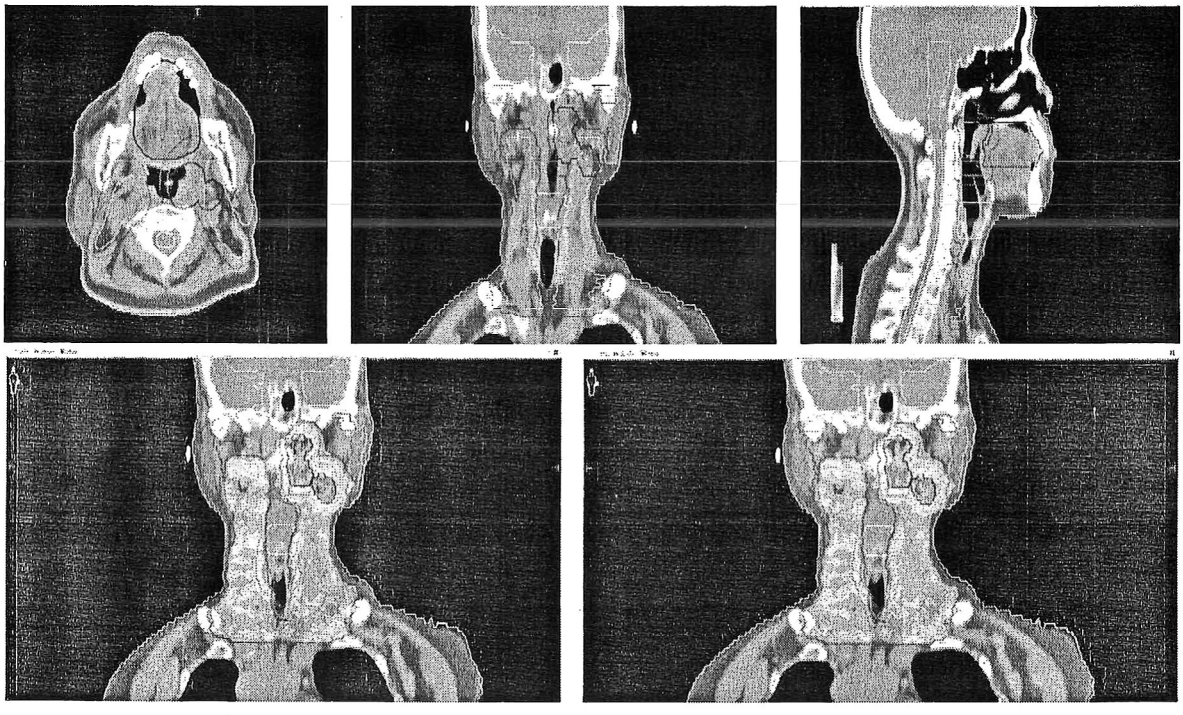
***Study's content:***

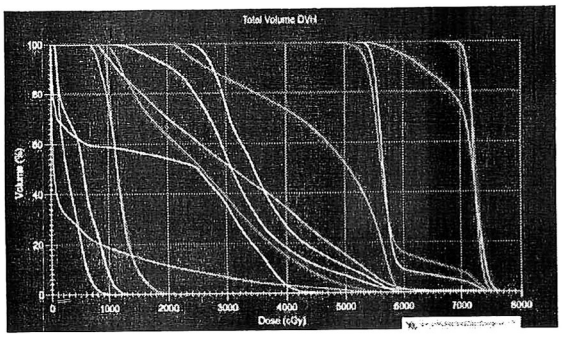
Patients examination before treatment: record information of the patients, including name, age, sex, reasons to hospitalise. TNM classification (UICC) [7], position, pathological specialization. Assessment of major complications including dry and burnt mouth during treatment ( WHO mouth burn classification [1] and NCLCTCATE dry mouth classification) [3]. Tumors and lymp nodes response assessment after 3 months according to clinical and subclinical examinations (CT, sub-laryngeal endoscopy, neck ultrasound,etc)

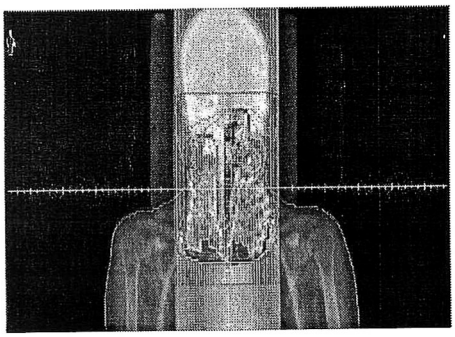
***Treatment therapy:***

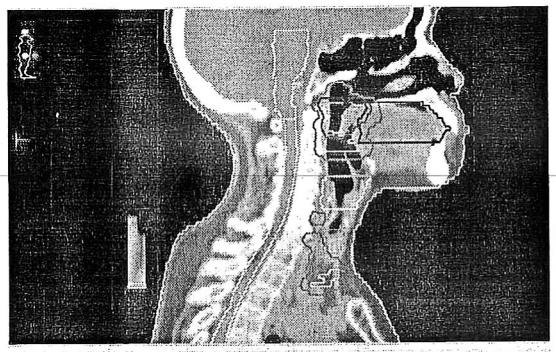
Patients undergo IMRT radiotherapy with daily cone CT.

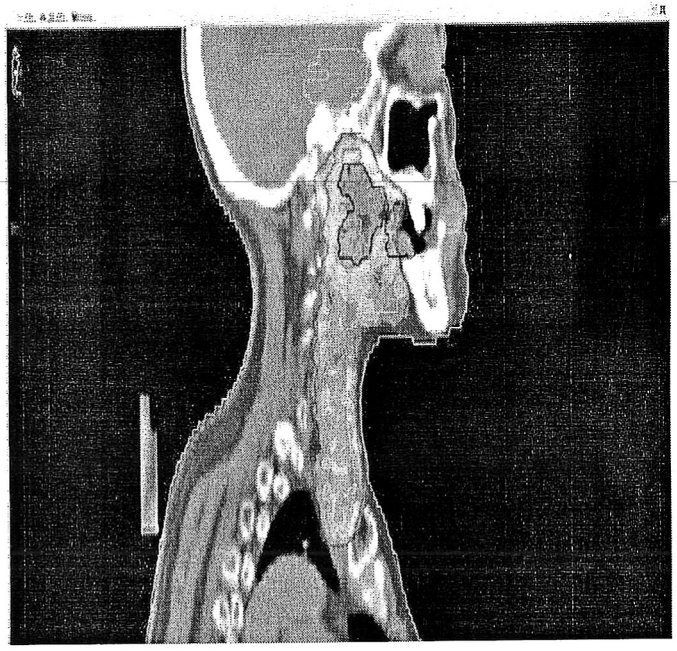
Patients with T3 and/or N+, we use chemoradiation therapy concurrent.

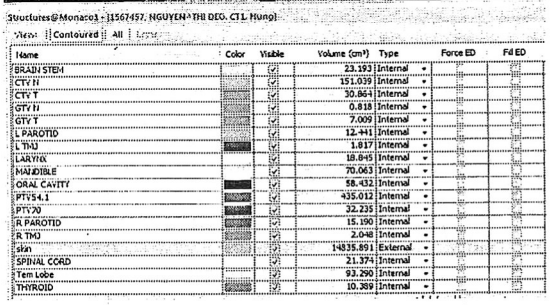











***Statistics analysis:***

Statitics are researched and coded on computer and analysed using SPSS 19.0.

## III. RESULTS

**Patients are studied up to 3 months.**

### 3.1. Patients' characteristics

*Age*

- Mean age: 62.32 ± 14.31
- Youngest: 40
- Eldest: 92

*Table 3.1. Gender*

| Gender | n | % |
|---|---|---|
| Male | 25 | 80.6 |
| Female | 6 | 19.4 |
| Total | 31 | 100 |

Male is the majority with 80.6%.

*Table 3.2. Reasons to hospital*

| Reasons to hospital | n | % |
|---|---|---|
| Obstructed Swallow | 21 | 67.7 |
| Neck lymph nodes | 10 | 32.3 |
| Total | 31 | 100.0 |

Main reason to hospital is obstructed swallow, which takes up 67.7%

### 3.2.Characteristics of tonsil cancer

*Table 3.3. Tumors' location*

| Tumors'locations | n | % |
|---|---|---|
| Right | 15 | 48.4 |
| Left | 16 | 51.6 |
| Total | 31 | 100 |

Percentage of right and left tumors are simillar and not different statistically.

*Table 3.4 Histopathological Differentiation*

| Differentiation | n | % |
|---|---|---|
| Well | 7 | 22.6 |
| Medium | 18 | 58.1 |
| Poor | 6 | 19.3 |
| Total | 31 | 100 |

Mean histological specialization of Medium and well level accounted for 81.7%

*Table 3.5. Tumour stage*

| Tumor | n | % |
|---|---|---|
| T1 | 1 | 3.2 |
| T2 | 2 | 6.5 |
| T3 | 28 | 90.3 |
| Total | 31 | 100.0 |

T3 tumors accounted for 90.3%

*Table 3.6. Node stage*

| Nodes' characteristics | n | % |
|---|---|---|
| N0 | 5 | 16.1 |
| N1 | 18 | 58.1 |
| N2 | 8 | 25.8 |
| Total | 31 | 100.0 |

N1 and N2 nodes accounted for 83.9%.

### 3.3. Radiotherapy

*Table 3.7. Mouth burns*

| Mouth burns' degree | n | % |
|---|---|---|
| 1 | 4 | 12.9 |
| 2 | 17 | 54.8 |
| 3 | 10 | 32.3 |
| Total | 31 | 100.0 |

2nd and 3rd degree burns accounted for 87.1%.

*Table 3.8. Dry mouth*

| Dry mouth degree | n | % |
|---|---|---|
| 1st | 4 | 12.9 |
| 2st | 21 | 67.7 |
| 3st | 6 | 19.4 |
| Total | 31 | 100.0 |

2nd and 3rd degree dry mouth accounted for 87.1%

### 3.4. Response assessment

*Table 3.9. Tumors' response assessment*

| Tumors' response | n | % |
|---|---|---|
| No tumor remains | 30 | 96.8 |

| | | |
|---|---|---|
| **Tumors remain** | 1 | 3.2 |
| **Total** | 31 | 100.0 |

Complete tumor response after 3 months accounted for 96.8%.

*Table 3.10.Nodes' response after 3 months*

| Nodes' response | n | % |
|---|---|---|
| **No node remains** | 29 | 93.5 |
| **Nodes remain** | 2 | 6.5 |
| **Total** | 31 | 100.0 |

Complete response rate after 3 months is 93.5%.

*Table 3.11. Tumors and node 's response after 3 months*

| Tumors and nodes' response | n | % |
|---|---|---|
| **No node or tumor remains** | 28 | 90.3 |
| **Tumors and nodes remain** | 3 | 9.7 |
| **Total** | 31 | 100.0 |

Complete nodes and tumors response after 3 months rate is 90.3%.

## IV. DISCUSSION

In our study, mean age of patients is 62.32±14.31 (min 40, max 92), male comprises of 80.6%, while female comprises of 19.4% of the cases. 2 main reasons to hospital were obstructed swallow and neck nodes, of which obstructed swallow is the major reason, accounting for 67.7%. This statistic matches studies of other authors in Vietnam.

Our study shows that the chances of tonsil cancer occuring in the left and the right side is simillar to each other. Medium histopathological specialization takes up the majority with 58.1%. Well and poor differentiation account for 22.6% and 19.3%, respectively. Study of Valentina Krstevska that used concurrent 3D radiotherapy on 36 patients with tonsil cancer resulted in 77.8% good and medium histopathological differentiation [6].

In our study about phases of tumors, T3, T2, T1 tumors accounted for 90.3%; 6,5 and 3.2%; respectively. Most clinical examination of nodes showed that N1, N2 and no node comprised 58.1%; 25.8% and 16.1%; respectively. Unlike studies around the world, but similar to domestical studies, tumors and nodes in our study were found at later stages, as cancer in Vietnam is usually found late, due to the late coming to hospital of patients in our country.

Assessment of radiotherapy complications in our study focus on 2 major symtomps: mouth burns and dry mouth. 2nd degree mouth burn accounted for 54.8%; while 3rd degree burn: 32.3%; 1st degree burn: 12.9%. Study of Chao using IMRT therapy on 12 patients with oral cavity cancer resulted in 42% 3rd degree burn; while study of Valentina Kresvska using 3D radiotherapy on 36 patients with tonsil cancer resulted in 58,3% 3rd degree burn[6].

Dry mouth assessment during therapy showed that 2nd degree dry mouth accounted for 67.7%, 3rd degree dry mouth accounted for 19.3% and 1st degree dry mouth took up 12.9% of the cases. Chao's study on 12 patients with oral cavity cancer resulted in 30% 3rd degree dry mouth [5]; while study of Valentina Kresvska using 3D radiotherapy on 36 patients with tonsil cancer resulted in 72.2% 2nd degree dry mouth [6].

Compared to normal routine 3D radiotherapy, dry mouth complication on patients treated with IMRT radiotherapy slightly fall but there is not a significant difference. The application of IMRT on organs in danger, including parotid glands help reduce the radiation dose received to that of less than the maxium dose possible, thus ensure the chance of preserrving the fuctions of the glands after treatment. In our study, as we only asset 3-month-post-therapy results, the full potentials of IMRT in side-effect reduction and posy-therapy life quality have not been studied adequately. We will continue the study and make futher reports in the coming conferences.

Concerning the tumors' responses after 3 months of surgery, there were one case in which the tumor remains (3.2%); 2 cases in which the nodes remain (9.7%); general rate that a nodes/tumor remain is 9.7%. Study of Valentina Krstevska that used 3d radiotherapy on 36 patients with tonsil cancer showed 72.2% of complete tumor response; 64% of complete nodes response [6].

## V. CONCLUSION

Initial application of IMRT in tonsilcarcer radiotherapy shows encouraging results. All organs, including parotid glands will receive less dose of radiation than that of maximum level, thus preserving their funtions and assuring their recovery after treatment. In our study, as we only asset 3-month-post-therapy results, the full potentials of IMRT in side-effect reduction and posy-therapy life quality have not been studied adequately. We will continue the study and make futher reports in the coming conferences.

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