

# Treatment Costs for the Patient with Head and Neck Tumours

Mario Jurić<sup>1</sup>  
Vedran Uglešić<sup>2</sup>  
Predrag Knežević<sup>2</sup>  
Irina Filipović-Zore<sup>3</sup>

<sup>1</sup>Department of ENT and Maxillofacial Surgery, Clinical Hospital Mostar, Bosnia & Herzegovina

<sup>2</sup>Clinic of Maxillofacial and Oral Surgery, University Hospital Dubrava, Zagreb

<sup>3</sup>Department of Oral Surgery School of Dental Medicine University of Zagreb

---

## Summary

*Surgery of head and neck tumours is complex and unequivocally expensive. There have been very few investigations to date in the world on the cost of treatment of this group of patients, and in Croatia not one. The aim of the present study was to determine the cost of treating patients with head and neck tumours, its structure and factors which have a significant influence on it. The study included 248 patients, treated in the Clinic of Maxillofacial Surgery in Zagreb during the period 1995 - 1996. The cost of treatment is presented as the total cost of hospital expenses, diagnostics, operations, anaesthesia and radiotherapy, and its dependence on all factors tested which we assumed to have a significant effect on it.*

*The average cost of treatment for the patient with head and neck tumours is 17,297 kn. The duration of hospitalisation, type of ablation and reconstructive surgical procedure has the greatest influence on the cost of treatment. Thus, intervention in this segment would enable the greatest savings. As the duration of treatment and type of therapy is decided by the physician, the planning and realisation of cheaper treatment is the responsibility of the physician.*

**Key words:** *head and neck tumours, treatment costs.*

---

Acta Stomat Croat  
2005; 73-76

ORIGINAL SCIENTIFIC  
PAPER

Received: November 3, 2003

Address for correspondence:

Mario Jurić  
Stjepana Radića 39  
88000 Mostar,  
Bosnia & Herzegovina  
Tel: +387 63 312 439  
e-mail: juricdr@cob.net.ba

---

## Introduction

The costs of health care in the world have steadily increased over the last ten years. Health costs not only burden the national economies of undeveloped countries but also of the most developed countries in the world (1, 2). Attempts have been made

to control further, uncontrolled increases in the cost of health care by the introduction of national programmes (3).

In the Republic of Croatia, after several decades of systematic stimulation of spending health resources, the time has come when available means are restricted and within which health care must be planned (4).

The treatment of the patient with head and neck tumours is complex and long-term. Few investigations have been conducted on the cost of treating patients with head and neck tumours (5), and in the Republic of Croatia no such study has been carried out to date.

The aim of this study was to determine the cost of treating patients with head and neck tumours, its structure and factors which have a significant effect on it, and which are connected with certain characteristics of the patient, disease and therapeutic process, and to discover a reserve, whose redirection would enable the achievement of saving.

### Patients and methods

The investigation included patients with head and neck tumours, treated in the Clinic of Maxillofacial and Oral Surgery, University Hospital Dubrava in Zagreb, from 10 April 1995 until 10 October 1996. Nineteen patients were excluded from the investigation who had started treatment after 10 April 1996, or had finished treatment after 10 October 1996, and patients with incomplete medical data. For the remaining 248 patients data on the patient, disease and therapeutic process were collected from the hospital records, and the cost of treatment for all patients was obtained from the hospital's accounts department. For each patient the cost of treatment is presented as the total cost: hospital accommodation and care, diagnostic tests/examinations, medication therapy, operations, anaesthesia and radiotherapy. Dependence of the cost of treatment and its components was tested in relation to all factors which we presumed to have a significant influence on it, and which are connected with certain characteristics of the patient, tumour or therapeutic process. For statistical analysis, analysis of variance (ANOVA) and multivariate regressive analysis were used. Tests were performed with the level of statistical significance of 0.05.

### Results

The study included 248 patients with head and neck tumours. The average age of the subjects was 52 years. Men three times more frequently suffered

from head and neck tumours than women. The most frequent type of tumour was intraoral carcinoma and carcinoma of the oropharynx (131 patients), and the most frequent histopathological type tumour was planocellular carcinoma (177 patients). Commando operation was most frequently practised (71 patients), and local flap was most frequently used for reconstruction of surgical defects (79 patients). The average duration of treatment was 33 days, average preoperative stay 8 days and postoperative 21 days.

The average cost of treatment for the patient was 17,297.8 kn (SD 15,157.8 kn), and the average cost of one day of hospital treatment 527 kn. The total share of the cost of medication therapy and hospital accommodation was 78% (13,668.6 kn) and the share of the cost of the operation and anaesthesia 14% (2,406.6 kn) (Table 1). Because of non-symmetrical distribution of mean values and medians the costs of treatment were computed with logarithms. The obtained geometric means differ from the non-transformed arithmetic means, although the mutual relations of factors of the total costs were retained.

Increased complexity of the ablation and reconstructive operation significantly influenced the duration of treatment and the total cost of treatment with  $p < 0.01$  for each of the aforementioned factors (Table 2).

The total cost of treatment showed 60% variation in the data ( $R^2 = 0.60$ ). Extended treatment increased the total cost by coefficient 0.01 ( $p < 0.01$ ). With this increase in the complexity of the ablation operation the total cost of treatment increased by coefficient 0.14 ( $p < 0.01$ ). Complex reconstructive operations caused an increase in the total cost of treatment, which increased by the coefficient 0.16 ( $p < 0.01$ ) (Table 3).

### Discussion

The average cost of treatment for the patient in this investigation was 17,297.8 Kn. The structure of this cost in which the share of so-called hospital costs were 78% is significant, which is almost twice as high as the adopted standards, in which the amount of hospital costs do not exceed 40% (6). The cost of the operation and anaesthesia in this study

amounted to only 14% of the total treatment costs, compared to the usual approximate 40% share in the world. Such a result is only partially a consequence of the reduced influence of economic laws on the cost of the operation and anaesthesia, and more the consequence of long-term hospitalisation, which most increases hospital costs.

The duration of treatment strongly effects the cost of treatment (3) and intervention in this segment could produce the greatest saving. The duration of treatment is directly dependent on the type and complexity of the ablation and reconstructive operation, which is impossible to influence during the phase of admittance to hospital. Reducing hospital treatment can be achieved by reducing the waiting period for the operation and reducing postoperative stay. Experience in the USA confirmed the possibility of realising saving at the expense of reduced treatment. Namely, following the introduction of Health Maintenance Organisations (HMO) (7) and Diagnosis Related Groups (DRG) (3,8) the average duration of treatment of the patient with head and neck tumours was reduced from 16 to 10 days, and preoperative stay from 3 to 0.9 days (3). The possibility of reducing treatment in Croatia exists, and the saving which could be achieved in this way is significant, because the average cost of one day of hospital treatment is 527 kn. It is possible to reduce preoperative stay by expeditious hospitalisation, outpatient preoperative preparation and correction of nutritional condition. The duration of the postoperative stay is directly connected with the preoperative condition of the patient, earlier diseases, type and extent of the operation and local or general postoperative complications. Experience in the USA confirmed that reducing postoperative stay can be achieved by coordinating activity of the therapeutic teams, education of the patient in self-help, earlier release into a hospital of lower rank and into home care (3). Additional reduction of treatment to an ideal 8 days is possible to achieve by introducing clinical therapeutic protocol (CCP) (9).

Treatment cost increases concurrently with the complexity of the ablation procedure. Patients with advanced local and regional disease require an expensive, combined method of treatment, which increases two-year survival by 30%, and five-year survival by only 10% (10). After introducing Diag-

nosis Related Groups in the USA the number of complex operational procedures was reduced from 22% to 15%, and the number of limited and moderately complex operations increased from 18% to 28% (3). Such practice enables satisfactory monitoring prior to prophylactic dissection of the neck in patients with initial disease and palliative operation prior to combined surgical-radiotherapeutic procedure in patients with advanced local and regional disease. By introducing such practice in Croatia, whereby for example complex ablation operations would replace extensive local operations, significant savings could be achieved because of the great differences in the total costs of such therapeutic models (18.703 compared to 9.275 kn).

The study established that the complexity of reconstruction significantly influences the cost of treatment. Reconstruction with microvascular free transplants is the most complex and expensive, although there are studies which have shown that the total cost of such reconstruction is lower than the cost of reconstruction of pectoralis major by a flap, because of the shorter treatment (13 compared to 20 days) (11,12) and less complications (23 compared to 50%) (13). In the present study we were unable to prove the financial benefit of reconstruction by free transplants. The basis reasons being the significant differences in the total costs of treatment for patients in whom reconstruction was performed by free transplants and pectoralis major flaps (43,060 compared to 24,161 kn), i.e. differences in the duration of treatment (70.5 compared to 50.2 days), which raises the question of the adequate selection and preparation of the patient. The study raises numerous professional, medical and ethical questions, which are difficult to answer without investigation of a larger sample, which would include not only oncological and economic parameters, but also psychological and sociological elements, which would show the justification and cost-effectiveness of reconstruction with free transplants. The duration of treatment, and selection of the therapeutic process, which includes the type of ablation and reconstructive operation, are directly dependent on the physician's decision, and raises the question of the responsibility of the physician to plan the therapeutic procedure which would be both medically and economically justified.

### Conclusions

- Share of hospital costs is high and amount to over 75% of the total treatment cost for the patient with head and neck tumours.
- The duration of hospital treatment has a powerful influence on the cost of treatment and it is possible to have an effect on it in all phases of treatment.
- Increased complexity of ablation and reconstructive operation has an effect on increased treatment costs.
- The influence of the physician on the duration of treatment and selection of therapy indicates the need for their more active participation in the planning of high quality and economically justified treatment.