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Review

THE MULTIDISCIPLINARY TEAM (MDT) IN THE TREATMENT OF HEAD AND NECK CANCER – A SINGLE-INSTITUTION EXPERIENCE

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ABSTRACT – Head and neck cancers are associated with significant morbidity and mortality despite advancements in treatment in recent decades. A multidisciplinary approach to the treatment of these diseases is thus of essential importance and is becoming the gold standard. Head and neck tumors also endanger relevant structures of the upper aerodigestive tracts, including bodily functions such as voice, speech, swallowing, and breathing. Damage to these functions can significantly influence quality of life. Thus, our study examined not only the roles of head and neck surgeons, oncologists and radiotherapists, but also the importance of the participation of different scientific professions such as anesthesiologists, psychologists, nutritionists, stomatologists, and speech therapists in the work of a multidisciplinary team (MDT). Their participation results in a significant improvement of patient quality of life. We also present our experiences in the organization and work of the MDT as part of the Center for Head and Neck Tumors of the Zagreb Clinical Hospital Center.

Key words: *Cancer; Head and neck; Multidisciplinary team*

Introduction

Malignant tumors of the head and neck comprise a heterogeneous group of tumors that are anatomically close but fairly different with regard to etiology, histology, diagnostic procedures, and treatment. Unfortunately, they are associated with significant morbidity and mortality despite advancements in treatment in recent decades. Head and neck cancers are the sixth most common malignant tumor globally, and over 830 thousand cases are diagnosed each year, with over 400 thousand patient deaths per year.[1]

In Croatia, 1003 malignant tumors of the head and neck were diagnosed in 2021, with 476 fatal outcomes, and no significant changes in average annual numbers have been observed in the last ten years.[2] Tumors of the head and neck result in serious consequences for patient quality of life, since they develop in the part of the body responsible for breathing, speech, and eating. The main risk factors for the development of head and neck cancer are exposure to carcinogens, es-

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pecially tobacco smoking and alcohol consumption, and infections with high-risk types of human papilloma virus (HPV). Approximately 75% of head and neck cancers can be associated with the use of alcohol and tobacco.[3] The clear causal relationship between the presence of HPV and development of oropharyngeal cancer should also be taken into consideration.[4] HPV-positive oropharyngeal cancer generally affects men younger than 65 with higher social status and is closely connected with oral HPV infection. Recent studies have also shown that the rate of HPV-positive oropharyngeal cancer is increasing in women and in developing countries.[5] One of the few studies conducted in Croatia that examined the association between HPV and oropharyngeal cancer on a sample of 104 patients found a surprising lack of influence of HPV and p16 on survival. One of the main factors that could have masked any positive influence of HPV / p16 on survival is history of smoking and alcohol consumption.[6]

Despite developments in surgery, radiotherapy, and different types of antitumor medication, five-year survival rates are between 40% and 50%, whereas average survival time for patients with recurrent/metastatic carcinoma is 10-13 months. Locoregional recurrence is a serious problem in these carcinomas and is present after the primary treatment in 20% to 30% of cases.[2,7] Treatment success and survival for these tumors depends on prevention measures, disease stage at diagnosis, the application of modern procedures in treatment, and the capacity to include different professionals from different medical fields in the treatment of the head and neck cancers through the multidisciplinary team (MDT).

The goals and responsibilities of the MDT

The goals of the MDT are to individualize the treatment, taking into consideration the nature of the disease, the general health of the patient, their social status, cultural habits, as well as the patient's expectations and the capabilities of the center performing the diagnosis and treatment. The goal is to apply all the available diagnostic and treatment procedures at the disposal of the MDT and the healthcare institution in which it was formed. The MDT is expected to maximally conform to the guidelines specific to the tumor site and provide improved coordination between caregivers and support teams as well as more effective care. Additionally, the MDT should be a source of active participation in clinical trials and scientific projects. The social responsibility of these teams cannot be neglected, as their active participation raises awareness of both individuals and society at large with regard to prevention, early diagnosis, and demonstrating the significance of forming centers of excellence.[8]

In addition to the above, an MDT should follow documented procedures and hold regular meetings in which all members are expected to participate. Working for patients in this way can provide evidence-based medical services tailored to the individual patient and reduce time from first visit to diagnosis and treatment. It is expected that the satisfaction, confidence, and trust of the patients and their families in the physicians making the decisions and conducting treatment will also be improved, reducing the need for second opinions, which in turn increase the costs and duration of the treatment. Furthermore, the existence of MDTs allows faster and simpler communication between experts, representing a place of continuous learning both for active members and for their younger colleagues entering the world of oncology.

Last but not least, such an approach reduces treatment costs, avoids duplication of diagnostic procedures, and provides faster treatment and increased quality of life, while the patient's earlier return to the community benefits both the patient and the community.

The impact of MDT on head and neck cancer outcomes

Multidisciplinary teams (MDT) are considered the gold standard for cancer care in many healthcare systems, but we still lack a clear definition of their format, scope of practice, and criteria according to which individual healthcare institutions could form MDTs. The European Partnership for Action Against Cancer has published a statement according to which MDTs are an important instrument in effective cancer care policy, and their continuous development is crucial to providing the care that patients need and deserve. The goal of this policy statement was to serve as a reference to policymakers and healthcare providers that want to improve the service they currently provide to patients with cancer, whose lives and wellbeing depend on their actions.[9] Analysis of different studies examining the importance of MDT for both treatment success and quality of life has clearly demonstrated the advantages of this approach. However, careful consideration is needed since many of the studies published so far have

been flawed due to a lack of valid control groups and the low number of prospective studies. This is understandable, as prospective studies on study subjects with no MDT participation would be impossible today and contrary to treatment standards achieved for tumors of the head and neck. However, evidence of success is still observable in different studies, despite the fact that these studies used a retrospective approach or meta-analysis.

Prades et al. conducted a systematic literature review of the Medline database and selected fifty-one peer-reviewed papers. MDTs resulted in better clinical and processing outcomes for patients with cancer, with a demonstrable improvement in survival among patients with of colon, head and neck, breast, esophagus, and gynecological cancers in the study period. It was also observed that MDTs were associated with changes in clinical diagnosis and treatment decisions with regard to urological, pancreatic, and gastroesophageal cancer, breast cancer, melanoma, bladder cancer, colorectal carcinoma, and prostate, head and neck, and gynecological carcinoma. The conclusion of this study based on these results was that the development of structured multidisciplinary care, minimal standards, and exchange of best practices should be encouraged.[10]

An Australian retrospective study found that patients who underwent MDT, in comparison with patients that were not monitored by a team, had better nutritive assessment (57% vs 39%) and assessment of use of adjuvant chemotherapy for high-risk diseases (49% vs 16%; p<0.0001). The period between surgery and adjuvant radiation therapy was shorter in the MDT group (p=0.009), as was hospitalization duration (p=0.002).[11] An American multicentric study demonstrated improved survival with MDT. Patients treated at institutions with a larger number of clinical studies had lower deviations from radiation therapy protocols (6% vs 18%; p<0.001) and better 5-year survival (69.1% in comparison with 51.0%; p=0.002). Treatment at institutions with less experienced experts had a greater risk of fatal outcomes.[12] A study by Friedland et al. analyzed 726 patients with head and neck carcinoma and compared treatment results for 395 patients (54%) treated with MDT and 331 patients (46%) not treated by an MDT. Patients with stage IV disease treated by an MDT had significantly improved 5-year survival in comparison with patients not treated by an MDT (p=0.004).[13]

In the first published metanalysis of this kind, Shang et al. included five cohort studies with 39 070 patients and analyzed the influence of MDTs on survival rates in patients with head and neck carcinoma in comparison with conventional procedures.[14] Patients treated as part of an MDT showed a higher survival rate [HR=0.84, 95% CI (0.76-0.92), p=0.0004]. The conclusion of this metanalysis was that an MDT based on conventional surgery, radiation therapy, and chemotherapy improves the total survival rate of patients, and future studies should examine the effectiveness of MDTs in patients with different stages of carcinoma.[15]

One of the important goals of MDTs is reducing the time between diagnosis and treatment commencement. Evidence has also shown how important this timeframe is and the influence MDTs have on it.[16]

In their meta-analysis, Murphy et al. aimed to demonstrate predictors for time to treatment start in patients with planocellular head and neck carcinoma. A total of 274 630 patients were included in the study. It was found that treatment with chemoradiation treatment (p<0.001) and treatment of stage IV disease (p<0.001) were associated with increased time to treatment commencement. This time was significantly increased for every disease stage (p<0.001), treatment modality (p<0.001), and type of institution (p<0.001) over time.[17] Rygalski et al. published their results on the effect of time from diagnosis to surgical treatment commencement in a retrospective cohort study on 37 730 patients from the National Database for Head and Neck Cancer. Patients who underwent surgical treatment more than 67 days after diagnosis was established had a significantly increased risk of death (HR=1.189; 95% CI 1.122-1.261; p<0.0001). For every 30 days of delay from time of diagnosis to treatment, the risk of death increased by 4.6%. The analysis showed that surgical delays were most prevalent for oropharyngeal tumors, followed by tumors of the oral cavity.[18]

In one of the most recently published studies, Meltzer et al. also emphasized the significance of MDTs on treatment success for tumors of the head and neck. In a retrospective study on 3081 patients with head and neck cancer (1431 patients before and 1650 after MDT implementation), total survival after 3 years was 77.1% and 79.9% (p=0.07), and disease-specific survival was 84.9% and 87.5% (p=0.05) for patients before and after MDT implementation, respectively. After 3 years, patients before MDT implementation had somewhat poorer total survival results (hazard ra-

tio 1,20; 95% CI 1.02-1.40) and poorer disease-specific survival (hazard ratio 1,26; 95% CI 1.03-1.54).[19]

All these studies clearly demonstrate the importance of multidisciplinary teams (MDTs) for defining optimal treatment strategies, and such an approach has been successfully applied in numerous countries, even becoming a legal requirement in some. Given the demonstrable improvements resulting from strict adherence to clinical guidelines, shorter treatment time, and improved outcomes stemming from MDT use, their introduction at appropriate institutions in Croatia will certainly improve treatment results and quality of life in patients with head and neck cancer.

MDT composition

The minimum staff that should comprise an MDT are a head and neck surgeon, an internal medicine oncologist, a radiation therapy expert, a pathologist, and a radiologist. The head and neck surgeon has a critical role in the MDT, both during diagnostics and during treatment, in determining the stage of the disease, selecting the initial therapy, patient follow-up during and after therapy, assessing treatment success, and in treating complications and potential recurrencies or residual disease after treatment.[20]

However, given the complexity of tumors in this region, in addition to physicians every MDT should also include other healthcare workers with experience in treating head and neck cancers, prevention of treatment side-effects, and improving quality of life. The role of this group of healthcare workers in the MDT is less pronounced but nevertheless very important. It is important for the general state of the patient, the overall psychophysical status, influence on quality of life, and potential complications that tumors and their treatment can lead to, not only in the head and neck area.[21]

This is corroborated by the study by Schorn et al. which aimed to assess potential correlations between specific patient needs for care with regard to holistic rehabilitation, family/social support, economic needs, and their influence on health-related quality of life. This retrospective analysis included a total of 1359 patients. The results showed a significant correlation between the patient's social connections and apathy, confronting depression, and anxiety. The patient needs for speech therapy, physical therapy, or respiratory training were only barely met, and patients even had to compensate for financial losses during hospitalization. In its conclusion, the study states that this research emphasizes the necessity of a multidisciplinary approach to the treatment of cancer and treatment-related side-effects, as well as improved awareness of the need for participation of healthcare workers in early postoperative patient care.[22]

Rigorous multidisciplinary treatment and assessment is thus indispensable, and it is of crucial importance that standard treatment including head and neck examination, radiation treatment, pathohistological evaluation, and HPV marker testing be supplemented with precise dental evaluation, nutritive status assessment, psychological profiling, and speech therapy assessment for speech and swallowing status, in order to optimize treatment and minimize side-effects. As opposed to the work of head and neck surgeons and oncologists, which has a defined scope and number of patients they must treat to as a precondition for their inclusion in an MDT, there are no standards for the inclusion of other healthcare workers such as nutritionists, speech therapists, psychologists, etc.[23]

The role of nutritionists in the MDT

Patients with head and neck cancers are under high risk of malnutrition due to the tumor location and treatment toxicity, but also due to previously existing negative environmental factors (inadequate diet, smoking, alcohol consumption, etc.).[24] Oncological patients have a specific diet regiment, requiring increased amounts of calories and proteins to allow their body to fight the malignant disease as effectively as possible. In addition to achieving sufficient quantitative intake of food, normal functioning also requires satisfying qualitative intake needs. Other than carbohydrates and fats, food intake must include sufficient amounts of protein, electrolytes, minerals, oligoelements, vitamins, and also fibers and other non-nutritive substances. Patients suffering from head and neck cancer, in addition to having a malignant disease, are also threatened by the location of the tumor. The incidence of body weight loss in patients with head and neck cancer is as high as 72%.[25]

Body weight loss in patients with head and neck cancers is directly connected with the chemotherapy toxicity, reduced treatment response, a deterioration of the general state of health and quality of life, and ultimately also with reduced survival rates. Such patients often experience a deterioration of nutritive status during treatment, and weight loss averages 10% in

comparison to body weight at treatment start. The reason for additional deterioration of nutritive status is the surgical procedure and problems due to wound healing, infections, and pain, as well as side-effects caused by chemotherapy and radiation therapy. Simultaneous application of chemotherapy and radiation therapy is associated with higher toxicity and complication rates in comparison with surgery or radiation therapy only. Some treatment toxicities can be long-lasting and become chronic: swallowing dysfunction, xerostomia, dental issues, taste alterations, and generally poor state of health that can have a significant effect on patient quality of life.[26,27]

Nutritive status assessment in patients with head and neck cancer must be performed both before commencing treatment and during the treatment itself in order to achieve timely identification and prevention of malnutrition or risk of developing malnutrition. The following parameters should be assessed when evaluating nutritive status and risk: height, weight, change and percentage of change in body weight, body-mass index (BMI), albumin, C-reactive protein, urea, electrolytes (parameters indicating the presence of refeeding syndrome), transferrin, food intake quantity and changes in appetite, capacity for chewing and swallowing, and presence other diseases that can negatively affect nutritive status (e.g. celiac disease, diabetes, inflammatory bowel diseases, etc.).[28]

Inadequate food intake in the preoperative period (14 days) is directly associated with an increase in morbidity and mortality. For patients with poorer nutritive status and in those who are at nutritive risk, introduction of preoperative oral nutritive support is recommended. If oral intake is not possible, introduction of a feeding tube is recommended.[29]

According to guidelines for preoperative application of enteral nutritive support, an assessment of nutritive status and nutritive risk should be conduced before surgical treatment, with the following recommendations:[29,30]

– all patients who are malnourished or are at risk of developing malnutrition benefit from preoperative nutritive support conducted 7 to 14 days before the surgery;

– preoperative fasting is unnecessary and may be harmful, and is thus not recommended as a routine measure;

– preoperative intake of 400 (800) mL of a clear carbohydrate drink the night before the surgery and 200 (400) mL up to two hours before the surgery does not increase risk of aspiration.

– discontinuing enteral nutritive support after the surgery without a clear clinical reason is unnecessary and may even be harmful for some patients; early post-surgery peroral food intake should be started 6-24 hours after the surgery.

Early post-surgery introduction of oral food intake already within 24 hours after the surgery is recommended. If oral intake is not possible, a feeding tube is recommended. Finally, it should be emphasized that a number of studies have shown that improving nutritive support before treatment reduces the incidence of infections, hospitalization duration, and severity of toxicity, and leads to improved survival.[31-33] All of the above emphasizes the importance and necessity of having a nutritionist as a permanent member of the MDT during the entire treatment process in patients with head and neck cancer.

Dental care as part of an MDT

Dental care for patients with head and neck cancer is essential and must be included in every phase of the oncological process. This process has distinct and independent phases in which it is crucial to control potential complications that can arise in the oral cavity after chemotherapy and radiation therapy. Every dental treatment should be preventive, if possible, since every dental treatment after oncological treatment will be less effective.

Before treatment, it is important to examine the dental chart of the patient, repair all teeth or remove the teeth that cannot be repaired, and prepare a dental treatment plan after completion of oncological treatment. During treatment for head and neck cancer, the recommendation to copiously hydrate the oral cavity is crucial, and at least one dental examination should be performed during the cancer treatment; artificial saliva or saliva replacement should be prescribed, and the patient should be referred to temporomandibular joint physiotherapy. All dental procedures should be avoided during chemotherapy cycles due to risk of complications. Thrombocytopenia and neutropenia caused by chemotherapy can lead to bleeding and fungal (candidiasis), bacterial (periodontitis, abscesses, necrotic gingivitis), and viral (herpes, cytomegalovirus) infection.[34] After completion of treatment, it is important to continue with adequate hydration of the oral cavity and regular dental controls (every 3 months), whereas

oral rehabilitation, i.e. prosthetic procedures, can be conducted after 6 months. Temporomandibular joint physiotherapy should be continued as well.[35]

Radiation therapy is the backbone of multimodal treatment of head and neck cancers. Unfortunately, radiation therapy is accompanied by numerous unwanted effects including xerostomia, caries, trismus, and osteoradionecrosis. Radiation caries represents a multifactorial and complex complication of the oral cavity. Induced caries presents the same morphological patterns of tooth decay as natural caries: accelerated demineralization and reduced remineralization of tooth structures, changes in translucence, reactive dentin, and intratubular dentin formation. Caries formation is mostly associated with hyposalivation and its consequences, especially altered saliva composition and a shift in oral microflora to flora comprising highly cariogenic bacteria with rapid development and progression.[37]

Clinical treatment of caries associated with radiation treatment is based on clinical experience, and preventive dental medicine programs should be of utmost importance. From the perspective of dental medicine, maintaining oral hygiene, daily use of topical fluoride, and monitoring cariogenic microflora play a central role in the prevention of caries caused by radiation.[23]

Osteoradionecrosis (ORN) is a well-documented long-term complication of radiation treatment. It is a slow process characterized by chronic, painful necrosis associated with poor healing and late sequestration as well as permanent bone deformation.[38] Removing healthy teeth before radiation treatment does not reduce the risk of ORN; the only teeth that should be removed before radiation treatment are those that are already in a poor state, especially if they will be in the radiation area.[39] An interval of at least 14 days between tooth extraction and radiation therapy is recommended in order to allow for complete healing of the extraction location, and the implantation procedure should be performed 6 to 24 months after treatment.[40] When ORN appears, treatment starts from conservative methods and proceeds to segmental mandibular resection with free vascularized bone grafts. The true effectiveness of hyperbaric oxygen therapy is still a topic of debate.[41]

The best treatment for ORN is prevention, and tooth and dental hygiene is the key to successful prevention of complications related to head and neck cancers, but the importance of the inclusion of oral medicine specialists in MDTs must also be emphasized.

Psychological support

Diagnosis and treatment of head and neck cancers has a number of psychosocial effects on patients, the most common being: depressive crises, fear of death and uncertainty about the future, and disability. Due to loss of basic human functions (speech, swallowing, taste, smell), patients with head and neck cancer have increased risk of acute reactions to stress in comparison with patients suffering from any other form of malignant disease.[42] Pronounced and continuous stress favors the development of psychiatric disorders, depending on the intensity and duration of the disease and especially on the presence of pain as a symptom. Psychological reactions and mental disorders change the progression and diagnosis of oncological diseases, which is further exacerbated by stigmatization, late identification, and inadequate treatment.[43]

The most common psychiatric comorbidity in head and neck cancers are mood disorders, predominantly depression. Other common disorders are posttraumatic stress disorder, eating and personality disorders, delirium, and behavioral disorders. Mental disorders and their symptoms make it significantly more difficult to conduct treatment, rehabilitation, and resocialization of patients suffering from head and neck cancers and accelerate functional damage and development of complications while also increasing treatment costs. An additional difficulty in identifying mental disorders is the overlap of their symptoms with symptoms of head and neck cancer and treatment side-effects.[43] Early identification of mental disorders through screening and application of diagnostic rating tools as well as timely selection of effective pharmacotherapy and psychotherapy are a precondition of improving quality of life and disease prognosis. Quality of life is also negatively affected by the mental effects of radiation therapy and chemotherapy and their side-effects: pain, pruritus, hot flashes, and poor mood. The prevalence of depression in patients with head and neck cancer is between 8% and 44%, depending on the literature, among which only a small percentage of patients seeks the help of a psychiatrist and/or optimal treatment of their own initiative.[44,45] Depression often presents in combination with other mental disorders: alcohol and drug abuse, anxiety disorders, and delirium. A diagnosis of depression increases mortality in patients with head and neck cancer by up to 25%, and is more common in women and patients undergoing radiation treatment.[46] It is estimated that the incidence of sui-

cide in patients with head and neck cancer is up to 4 times higher than in the general population. The risk is highest during the first years after establishment of the diagnosis, especially in patients with advanced disease stages, and the risk becomes lower over time, equalizing with the suicide risk in the general population after 5 years from diagnosis. Risk factors for suicidal ideation and attempts in patients with head and neck cancer are: feeling they are a burden to others, loss of autonomy, desire to control one's own death, physical symptoms (pain), depression and helplessness, existential anxiety, loss of social support, and fear of the future.[43,44]

The prevalence of PTSD in the period of 6 months after diagnosis is 22%. The clinical implications of PTSD in patients with head and neck cancer include increase sensitivity to pain and other physical symptoms as well as depression and increased morbidity and mortality.[47]

Given the seriousness of mental disorders that can manifest in patients with head and neck cancer, modern psycho-oncology points to a multidisciplinary approach as the most effective and all-encompassing form of care for these patients. The psychiatrist's role in the team is, in addition to monitoring and treatment, to provide psychoeducation for the patient, their family, psychologists, nurses, and medical specialists, as well as continuous processing of stressful situations and feelings. Coordinated activity by all team members accelerates the treatment process in patients, strengthens their defensive mechanisms and hope for recovery, and improves patient quality of life.

Speech therapy support

Functional disorders present in patients with head and neck cancer depend on the type and location of the tumor, the extent of the malignant disease, and the treatment modality. The preservation of anatomical structures during treatment does not guarantee preservation of organ function. Even organ preservation surgery or radiation therapy or chemotherapy often lead to significant functional disorders. These disorders can present before treatment, during treatment, and after treatment. The most common disorders in patients with head and neck cancer are: breathing, swallowing, voice, and speech disorders, reduced mobility of the orofacial musculature, neck, and shoulders, lymphoedema, and pain.[48] The voice quality and speech can be significantly damaged. Vocal articulation is most often compromised by tumors of the oral cavity and tongue, tumors of the palate and nasal cavities, and paranasal sinus tumors. At the same time, paranasal sinus tumors affect voice nasality, while hypopharyngeal tumors and laryngeal tumors influence voice production. Voice and speech rehabilitation is usually performed simultaneously. The main goal of speech therapy is influencing phonation mechanisms and forming the best possible phonation at the glottal level, whereas the goal of speech rehabilitation is to achieve precise articulation and the best possible mobility of the damaged articulatory.

Speech loss after total laryngectomy significantly influences the psychosocial state of patients and significantly affects their quality of life. The inability to speak, or speaking with their "new voice", results in very important changes to a patient's everyday life and can significantly affects the patient's social relationships, which can ultimately lead to anxiety, depression, and alterations in the patient's self-respect and self-confidence.[49] Today, tracheoesophageal speech using a speech prosthesis is the gold standard for speech rehabilitation in patients undergoing laryngectomy.[50]

Almost all patients with head and neck tumors have swallowing disorders – dysphagia and difficulties ranging from bolus formation to bolus transfer to the pharynx and esophagus that can manifest before, during, and after treatment.[51,52] Symptoms that present are prolonged eating times, sialorrhea, bolus leakage from the mouth, bolus retention in cheek "pockets" and under the tongue, food sticking in the throat, dehydration, malnourishment, aspiration pneumonia, bolus intake and formation disorders, coughing during and after swallowing, and suffocation. The goals of dysphagia rehabilitation are changing bolus consistency, altering body position, performing maneuvers during swallowing, and training exercises for strengthening, relaxing, and coordinating muscles.

Rehabilitation of functional disorders is a complex but necessary process that every patient should undergo in order to improve quality of life. Engagement of a speech therapist is important to prevent and minimize the effects of such functional disorders, and it is also necessary to ensure continuous monitoring in the process of rehabilitation until stabilization. Treatment for head and neck cancer saves lives, and voice, speech, and swallowing rehabilitation provides patients with the opportunity to achieve independence and higher quality of life.[53]

MDT in the Zagreb Clinical Hospital Center

The Zagreb Clinical Hospital Center is the largest and main medical institution in Croatia that receives patients from every region in Croatia and from neighboring countries. A multidisciplinary team for head and neck cancers has been employed for decades at the Ear, Nose and Throat Clinic and the Clinic for Head and Neck Surgery, changing its composition and methods over time. As a rule, as has been the case for many years, patients at an advanced stage of the disease were referred to the MDT comprising a head and neck surgeon, oncologist, pathologist, and radiologist. Ten years ago, the Clinic changed the MDT workflow by organizing presentation of all patients with head and neck cancers treated at the Clinic. All relevant digitalized images of the tumor prior to treatment, radiological images, and histological samples as well as images taken during the surgery and eventual complications, are included in a single presentation using Microsoft PowerPoint® using similar conferences as a template.[54] In the meantime, online radiological examinations also became available in the meetings, significantly facilitating the work of the MDT and treatment planning. The MDT has been expanded, with active participation of a speech therapist and physiotherapist, and MDT meetings include mandatory attendance of otolaryngology specialists as a valuable mode of learning. Over the last decade, this approach has resulted in over 3 and a half thousand presentations that have been placed in a centralized database comprising newly-diagnosed tumors and updates in case of recurrence, further primary tumor diagnoses, or other clinical events. This approach is also a very valuable addition to long-term clinical follow-up.

Given the current trends in head and neck cancer treatment, and faced with the Covid-19 pandemic during which we had to work in more difficult conditions[55] and when preliminary reports indicated a danger of a reduction in diagnosis and treatment of these tumors, we decided to form the Center for Head and Neck Cancer. We first formally separated it from the Ear, Nose and Throat and Head and Neck Surgery Clinic and formed it at the level of the Zagreb Clinical Hospital Center. The new Center includes participation by experts from ten different clinics. We also took advantage of the fact that a Department for Maxillofacial Surgery and a Clinic for Neuroradiology were formed at the Zagreb Clinical Hospital Center. We expanded our center with new collaborators, so the existing members of the MDT (an otorhinolaryngologist, internal oncologist, radiation therapist, pathologist, neurosurgeon, radiologist, nuclear radiologist, speech therapist, physiotherapist, and oncological nurse) were joined by a maxillofacial surgeon, nutritionist, stomatologist, psychologist, psychiatrist, and social worker.

This new organization addresses all the problems faced by our patients and coordinates solutions in the fastest and most adequate manner. Additionally, a new digital database has been created, which is integrated with the hospital patient data system, which will enable input and storage of far more quality patient data. Since there is an option for actively searching the digital database, it is possible to very simply access relevant data on treatment success, complications, etc. The MDT meets once a week, accompanied by a digital media presentation as before. Such an approach, given that this is a unique center within the Republic of Croatia, has resulted in an increased number of patients presented to the MDT, with 8 to 20 patient presentation per MDT meeting, totaling 672 presentations in the last year. These presentations include newly-diagnosed patients with head and neck cancer, patient presentations after completion of surgical treatment or chemotherapy, and presentations of complications. We also reorganized the workflow of the day hospital and oncological clinics. The work of the oncological clinics at the day hospital, which includes 3 head and neck surgeons with experience in oncological surgery and one oncologist, is organized on the day before the MDT meeting. Given that 9 head and neck surgeons work at the clinic, surgeons rotate every 3 weeks, since they also perform weekly duties at the otorhinolaryngological clinic in addition to oncological work. Except for emergencies, all patients with head and neck cancers are examined exclusively on that day. This ensures that all patients with head and neck cancer receive a high-quality examination by an experienced oncologist and oncological surgeon, who can immediately consult with one another. It has also been ensured that patients, given that they usually want to, can be clinically examined and monitored by the oncological surgeon that performed the surgery. In cooperation with other clinics within the Zagreb Clinical Hospital Center, we have ensured that patients can receive a videoscopy, stroboscopy, neck ultrasound with a cytological puncture, head and neck CT and all these procedures can be done in the Center on the same day.

We have thus maximally reduced the waiting periods for individual procedures and ensured our patients receive quick and maximally effective examinations. At the same time, we have increased patient satisfaction and safety as well as the safety and quality of the work of oncological surgeons and oncologists. We have thus achieved complementary integration of clinical examinations and processing with presentation of patients to the MDT. Furthermore, we have initiated procedures to link our clinic with similar centers across the world as well as research centers in Croatia, in order to participate in translational research as the optimal way of connecting research and clinical practice. Of course, time is required for a full evaluation of the successfulness of these measures, but preliminary results are extremely encouraging. In addition to the changes noted above, all patients must undergo determination of their psychological profile, speech pathology status, dental examination, and dental rehabilitation before treatment. We consider all of this to be important both for the adequate preparation of patients, who feel safer as a result of this approach, and in order to improve treatment success and patient quality of life. Of course, these procedures result in higher costs due to additional engagement of resources and staff, but the expected long-term result is beneficial in this respect as well, given the expected reduction in time to diagnosis and treatment commencement, improved treatment results, reduced patient absence from work activities, and better quality of life. In Croatia, there is currently both the capacity and the need for the formation of similar centers of excellence at the level of clinical hospital centers, which should be linked by a singular database, thus fully addressing all the needs and challenges related to head and neck cancer. We believe that the organizational approach to the formation of multidisciplinary teams for the treatment of head and neck cancer that we have described is applicable to other institutions as well.

Conclusion

The MDT approach has been successfully implemented in numerous healthcare institutions, where it is now considered the gold standard of care for patients with head and neck cancer. Inclusion of specialists from different fields guarantees full and continued support for patients during diagnosis, treatment, and the follow-up period. In the individualized approach to treatment, it is important to ensure that the team includes experts who can prevent or rehabilitate various functional disorders that manifest in patients with head and neck cancer. These include difficulties with breathing, voice, speech, swallowing, nutritive status, and severely deteriorated psychosocial stability. Recognizing and treating these disorders significantly improves quality of life. It is important to initiate optimal MDT formation in centers with conditions to implement them, as well as to actively link them and achieve active participation in translational research.

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Sažetak

MULTIDISCIPLINARNI TIM U LIJEČENJU KARCINOMA GLAVE I VRATA-ISKUSTVO KBC ZAGREB

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Karcinomi glave i vrata povezani su sa značajnim morbiditetom i mortalitetom unatoč napretku u liječenju posljednjih desetljeća. Multidisciplinarni pristup liječenju ovih bolesti stoga je od iznimne važnosti i postaje zlatni standard. Tumori glave i vrata također ugrožavaju relevantne strukture gornjeg aerodigestivnog trakta, uključujući funkcije kao što su glas, govor, gutanje i disanje. Oštećenje ovih funkcija može značajno utjecati na kvalitetu života. Stoga je naše istraživanje ispitivalo ne samo ulogu kirurga glave i vrata, onkologa i radioterapeuta, već i važnost sudjelovanja različitih drugih kliničkih profesija poput anesteziologa, psihologa, nutricionista, stomatologa i logopeda u radu multidisciplinarnog tima (MDT). Njihovo sudjelovanje rezultira značajnim poboljšanjem kvalitete života bolesnika. Također predstavljamo svoja iskustva u organizaciji i radu MDT-a u sklopu Centra za tumore glave i vrata KBC-a Zagreb.

Ključne riječi: *Rak; Glava i vrat; Multidisciplinarni tim*