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Head and Neck Cancer Patients' Quality of Life

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation;
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Abstract

Patients suffering from head and neck cancers often require a multidisciplinary approach before and after surgery. Restoration of facial esthetics, speech, mastication and others often requires a long-lasting, divided rehabilitation. Quality of life (QOL) is measurable in a patient's life before and after surgery and complete treatment. The state of QOL has different parameters depending on the patient's clinical diagnosis, type of treatment and surgeries performed. In this paper, the authors are focusing on the quality of life of patients suffering from head and neck cancers and a proper multidisciplinary approach to achieving proper functions will be described. Also, the patient's self-esteem improvement and psychological evaluation is necessary (*Adv Clin Exp Med* 2014, 23, 6, 1019–1027).

Key words: quality of life, head and neck cancers, patient's life, functions after surgery.

Cancers of the head and neck are a well-known, world-wide diagnostic and therapeutic problem. Many patients require long-lasting treatment involving surgeries, chemo- and/or radiotherapies (CRT). Only with special protocols involving full therapeutic rehabilitation can lost functions be preserved or restored. Without restoring or minimizing the loss of function of vital structures or organs, the patient's life worsens. Because of the growing occurrence of head and neck cancer (HNC), special steps need to be taken.

In 1991, the World Health Organization (WHO) initiated a project concerning the quality of life, the WHOQOL project. Its main purpose was to evaluate and compare the quality of life of individuals according to specially prepared assessment instruments. The WHOQOL-BREF is comprised of 26 items, although many different versions are used world-wide to measure patients' QOL in various scopes. HR-QOL, health-related quality of life, is often used in many studies and medical trials because of its usage in the patient's perception of chronic disease and its influence on daily routine. It seems that various factors coexisting together may seriously decrease a patient's well-being. Upper aero-digestive tract treatment

during a cancer protocol requires special attention from clinicians and surgeons. Concerning head and neck cancer (HNC) patients, proper nutrition is essential to the patient's QOL [1, 2].

It's necessary to remember that various forms of therapy can affect different aspects of a patient's well-being. Also, surgical resection margins and the range of surgery have a great impact on the patient's QOL. Questionnaires can be performed on either stage of therapy. In this review, we are focusing on factors greatly related with patients' QOL in general.

Physical functioning, swallowing, senses of taste and smell, speech, hearing, mastication (teeth, saliva, proper occlusion), self-esteem, contacts with others, function loss and change in facial appearance; these seem to be very important factors involved in quality of life; however, combined together may seriously decrease a patient's QOL.

QOL can also be predictable. According to de Graeff et al., because of the ability to evaluate patients (if they have any depressive symptoms or have a potential risk of physical and psychological morbidity after treatment) psychologically, it is easier to predict how a patient will react to treatment [3, 4].

Quality of Life

Because QOL can be measured by various means, it is also quite easy to use it to measure and predict many variables during treatment. CRT and surgery have a great effect on patients' QOL. Many studies performed world-wide describe patients' well-being as a very important factor related to advanced treatment.

Wan Leung et al. compared modern radiotherapy (RT) with QOL (RT-QOL) in 640 patients with HNC (head and neck cancer) in a period of time from January 2005 till December 2008. The authors used an EORTC QLQ-C30 (European Organization of Research and Treatment of Cancer Quality of Life Core Questionnaire, version 3.0) questionnaire and a QLQ-H&N35 module in a study group consisting of 371 patients treated with two-dimensional RT (2DRT), 127 with three-dimensional conformal RT (3DCRT) and 142 with intensity-modulated RT (IMRT). It is important to note that the changes made in radiotherapy are very important considering the effects on the head and neck regions. The study shows that 316 cases of the nasopharynx, 129 of the oral cavity, 75 of the oropharynx, 75 of the hypopharynx and 45 of the larynx are slightly different because of the patient's age, cancer type, treatment and sociodemographic factors. It seems that IMRT (intensity-modulated radiation therapy) radiotherapy can improve the patient's HR-QOL, perhaps because of less saliva lack off function and radiation only performed at the selected area, not involving huge amounts of surrounding tissues. More studies need to be performed to further analyze less RT-related symptoms in the head and neck region; however progress in radiation therapy is one of the most important factors in HNC patients [5].

Different types of cancers, tumors and other head and neck diseases influence patients' QOL. Squamous cell carcinoma in the head and neck (SCCHN) is a very demanding disease from both patient and clinician. In order to achieve greater therapeutic success, a combined, multidisciplinary treatment should be assessed.

Squamous cell carcinoma in the head and neck (SCCHN) is a commonly diagnosed tumor in the head and neck region. A study performed by Rodriguez et al. was done on 29 patients and consisted of 3 stages of questionnaires: onset, middle and end treatment with the use of a QOL Core Questionnaire – Cancer 30 and QOL Questionnaire – Head and Neck, European Organization for Research and Treatment of Cancer [6]. According to the authors of the study, some values are significant: taste and smell, cough and weight loss, although in the middle part of treatment, issues such

as pain, swallowing, dental problems, cough and use of analgesics have a greater impact than others. On the other hand, the authors describe late symptoms regarding patients' QOL. Those symptoms are mainly: nutrition and food supplement usage, disability of full mouth opening, changes in olfaction and taste, speech disorders, social difficulties in feeding and loss in sex drive with a feeling of being sick. It seems that not only the therapy type with newer protocols but also socio-demographic and economic aspects are very important in HNC patients [7, 8].

Many authors describe dysgeusia, a distorted or impaired sense of taste that is common to over 50–75% of all patients treated with HNC [9]. The sense of taste and smell have a great effect on patients. Proper nutrition is also very important in proper HNC patient therapy, and preserved taste and saliva functions seem to have an influence on it, mostly because of the patient's positive sensations. Some patients even after therapies have less of a sense of taste [10]. Other important issues are increased nausea and vomiting symptoms, loss of appetite and CRT effects decreasing the patient's weight and fitness condition [11].

HNSCC is a dangerous HNC. Osthus et al. performed a study on patients with HNSCC treated from 1992 till 2001 from western Norway. The authors tried to predict the survival of long-term health-related QOL in HNSCC patients. During the analyzed time, only 24 deaths were observed, and factors such as fatigue, dyspnea and sleep disturbances were present in the health-related QOL essay. Usage of the EORTC QLQ-C30 questionnaire seems to be a great tool in predicting and measuring long-term survival prediction [12].

Pain seems to be very common in HNC patients. According to Epstein et al., pain is present in about half of patients before treatment, 81% during treatment, and 70% at the end and in 36% of patients to 6 months after treatment. Painkillers, and proper pain drug administration is essential to reducing the patient's pain and improvement of their social life [13]. Highly intense pain may also require special pain-therapies or pain sessions in order to minimize it and increase the patient's QOL.

Sleep quality in HNC patients is also a very important subject. Dry mouth syndrome after radiation is also dependent on good sleep. Lack of sleep decreases the QOL of cancer patients, induces stress and lack of healing, but also may complicate the treatment. Patients suffering from cancers of the throat and surrounding structures have more breathing problems than others, and tracheotomy is also another important factor in this problem [14]. Perhaps in intensity-modulated radiation therapy in HNC patients, the salivary glands could

be preserved and saliva function could minimize dry mouth syndrome and improve very important factors such as sleep [15]. Lack of sleep might be related to psychological breakdowns or others.

HNC patients are a very special group of patients, with different aesthetic and functional needs. Because of the close surroundings of vital structures in the head and neck, and the high impact of alcohol, tobacco and other factors, many organs and tissues are under the influence of risk factors. A patient's social behavior and daily exposure to carcinogens have a great effect on cancer predisposition. QOL is described as improvement of life in patients suffering from life-threatening diseases. An HNC patient's palliative care is very demanding and requires the full scope of challenging care. Mitra et al. divided QOL into special branches that need to be taken care of in order to achieve as good results as possible [16]. Swallowing, voice, airway control, nutrition, pain, mucositis control, xerostomia, taste and auditory function, wound care (fistula and carotid rupture), osteoradionecrosis, dermatitis and soft tissue damage, and psychological support seems to be the most important factors in proper life relief therapy [17].

Because of many factors involved in patients' QOL in HNC, it is highly recommended to describe all the potential risks related with surgery, treatment and CRT that influences or might occur and be related with the patient's QOL.

One of the most important factors is nutrition. In order to fully function, salivary glands and mastication function should be maintained as much as possible.

Swallowing and saliva function are very important factors in breathing, eating and talking. In pharyngeal cancers, swallowing might be impaired and might lead to coughing, respiratory distress, dyspnea at night or problems with breathing. Logermann et al., presented cases demonstrating that HNC patients with mouth floor or tongue base cancers had more problems after resection in swallowing than other laryngeal patients [18]. Because of that, special tissue preparation after the procedure for future different nutrition and food consistency type is very important [19]. Studies performed by Kulbersh et al., seem to confirm that swallowing (dysphagia) may be impaired after HNC treatment. Nevertheless, the authors concluded that education and exercise before surgery improves dysphagia specific QOL [20]. During healthy ageing, swallowing seems not to be impaired, but a study done by Leow et al. shows that dysphagia might occur with other situations, such as advanced therapies, and also in Parkinson's disease [21]. Saliva replacements, routine dental check-ups and daily exercises should be performed.

Saliva and masticatory structures are also responsible for proper speech and voice pronunciation. Most surgeries performed in the laryngeal region or on vocal cords might be related to voice malfunction; however, tongue base and mouth floor surgeries also have a great influence on these structures. The range and measures of the surgery causes significant changes in speech organs.

Voice and speech ability is very important for communication and the patient's well-being. Speaking is related to the lips, tongue, teeth, soft and hard palate and is also determined by the relations of the nasal and oral cavity and upper posterior pharyngeal region. The soft palate is essential to proper speech, and any resections in that area might lead to hypernasality, nasal regurgitation and inability to properly articulate. Special procedures involving reconstruction of the soft palate need to be considered before any resections, because of the importance of this region. Other groups of patients are those suffering from cancer in the laryngeal region, which is related to the voice volume [22]. Lesser voice volume might also be related to the vocal cords or muscle dysfunction after therapy [23]. Some authors recommend surgery or an alternative such as phonosurgery, voice implants, and collagen injections into the vocal cords or others [24]. Additionally, voice rehabilitation and speaking lessons are recommended, mostly carried out by local logopedists [25, 26]. Thomas et al. also explain that speech and voice are related to radiotherapy, tumor stage and free-flap reconstruction [27]. After performing a total laryngectomy, various voice restoration methods could be used, for example, TEP (tracheoesophageal speech), electrolarynx and esophageal speech [28]. De Coul et al. described ASV (automatic stoma valve) usage in 79 laryngectomized patients as an alternative to improve voice quality for patients who were using sign language or gestures to communicate [29, 30].

Proper breathing and airway circulation are very important. Because of the resection procedure in the upper airway tract, a lack of proper breathing may occur and in some cases along with a lack of proper chewing and swallowing function. It is essential to plan and reconstruct the resected area, taking into consideration that obstructed airways might lead to shortness of breath, suffocation and problems with eating and proper pronunciation [31]. If proper airways are not formed or reconstructed, tracheostomy might be considered, but in order to use it, suction and routine cleaning of the tube and granulated tissue evaluation should be performed. Without greater care of both the patient and the tube, limited therapeutic success will occur. The authors also describe different technical approaches. Because of the applied tracheostomy,

the ability to speak should be preserved and it can be done with the usage of special syringes, specially formed tubes or manually used valves in the tube. Obstructive sleep apnea (OSA), according to Friedman et al., is common in 9.1% of males and 4% of females after HNC, and is related to an obstructed upper airway that usually collapses during sleep [32].

Diet and nutrition is an essential key to survival and an important marker in HNC treatment. Therapy can cause weight loss, therefore nutrition is very important to ease therapy and induce treatment [33]. Oral pain, surgery and therapies may relate to oral food intake and its form. It could be decreased because of pain, obstruction, mechanical dysfunction, tooth loss, swallowing difficulty and saliva function. Preserved sense of taste and smell seem to have a positive effect on HNC patients. Gastric, naso-gastric tubes and other feeding tubes diminish oral intake and might lead to mucositis [34]. Weight-loss after therapy, according to different authors, might be from 3% to 15%. It is also good to be aware that, in the terminal stages of HNC, patients' bad nutrition and weight-loss might be related to a general lack of appetite and patients' mental breakdown. In this case, differential diagnosis and a careful patient clinical examination should be performed. Morton et al. concluded that nutrition for HNC patients is a very important care component, and early PEG (percutaneous endoscopic gastrostomy) insertion and duration have favorable QOL-related outcomes. During a study on 75 patients with HNC, Ravasco et al. showed that dietary counseling has a positive effect on QOL and treatment, and should be used [35]. Other studies also advise an early visit to a dietitian and speech pathologist, because combined therapies increase patients' QOL in HNC [36]. In conclusion, many different specialists have to participate in HNC patient treatment.

Most surgery and therapies in HNC lead to different pain intensity. Pharmacological control of cancer pain is administered according to an analgesic ladder; however, some cases require an independent approach. Pain is related to tumor presence, but also might be tumor-related and can be present in soft or hard tissues and can be a type of neuropathic pain. Painful neuropathies might be related to tumor spread along nerves and tissues and also its presence near the base of the skull, causing head and neck neuralgias. In HNC patients, chronic pain is very common and might vary post treatment. It is worth knowing that during neck dissection, sparing of the spinal accessory nerve might lead to shoulder pain, and a study done by Short et al. seems to confirm that [37]. Therefore, shoulder pain should be compared to other types of pain,

even those related to ischemic episodes. Not only drugs and steroids might be used to ease the pain, but also relaxation drugs, topical agents and local or physical rehabilitation. Also, after chemoradiotherapy, due to a lack of saliva and in some cases induced mucositis, pain might occur. Pain that might be present after some time after therapies might be a first symptom of HNC recurrence. If standard drugs don't work, fentanyl or morphine is used commonly, but in some cases surgical intervention is done in order to block nerves, or other neurosurgical procedures are performed to ease the pain. Shoulder pain after neck dissection requires a special training protocol [38, 39]. The quality of life after various approaches to neck dissection might be different because of a preserved spinal accessory nerve (SAN), and a study done by Inoue et al. indicates that patients with SAN presence have better QOL and arm function [40]. Mantyh describes pain as a factor involved strongly in patients' QOL and therapy [41]. The patient's life span and QOL should be increased during CRT in HNC [42].

Mucosal tissue that is present in the head and neck regions, after CRT might be discolored, with present erythema, and mucositis might occur [43]. *Candida albicans* or other flora might show up and decrease important functions such as swallowing, eating, chewing and even speech. In many cases it is related to saliva presence after CRT. A review of fungal infections made by Lalla et al. suggests that the average chance of fungal infection during CRT is 39.1%, and 32.6% after CRT, and prophylactic use of fluconazole seems to decrease potential infection to 1.9% [44].

Another symptom related to saliva deficiency is xerostomia. After CRT usage, the function of minor and major salivary glands is decreased or even fully destroyed. Lack of saliva and its proper function leads to dental caries, problems with chewing, eating, speech, swallowing, mucosal irritation and pain and causes loss of weight. The advancement of xerostomia might lead to the occurrence of other oral cavity lesions and cause problems with nutrition. Patients with HNC suffering from lack of saliva are using special rinses in the oral cavity, such as sodium bicarbonate or others, to achieve proper dental hygiene, mucosal wetting and lesser irritations. Pilocarpine, Amifostine or other agents are used to treat radiation-induced xerostomia. On the other hand, Cho et al. noted that manual acupuncture in RT patients induced unstimulated salivary flow rates [45]. Despite that, RT used in HNC that does not target salivary glands has lesser damage and also, in a study made by Henson et al., contralateral glands are preserved at 1 year post-RT [46]. Duncan et al. performed a randomized trial that suggested antimicrobial lozenge did

not impact QOL, however notes that the side effects of RT are mostly oral pain in more than 90% of HNC patients, fatigue and increased dry mouth syndrome (DMS) [47, 48].

Senses such as taste and hearing are also vulnerable in CRT and cause patients' QOL to decrease. Taste alternation is caused by the usage of CRT agents, drugs, lack of saliva and the presence of operated regions in the oral cavity and tissue scaring. Doses over 600 Gy induce taste loss and also increase nausea and vomiting. Because these patients' QOL is very poor, without proper psychological motivation and adequate nutrition, patients' well-being and comfort are decreased. Baharvand's et al. study highlights that HNC RT causes impairment in taste perception and QOL is influenced by dysgeusia [49]. Authors also conclude that taste alteration is not related to age, sex, RT fractions, dosage and patients levels of education. The senses of taste and smell are decreased after CRT and, according to Epstein et al., further studies are required to evaluate its influence on QOL. However, in some cases it has a negative influence on QOL in HNC patients [50]. Either cancer or the therapeutics used influence taste sensation and further studies need to take place to diagnose this problem.

It seems that not only oral and nasopharynx regions are especially vulnerable to CRT but auditory function may also be decreased because of HNC. Either chemotherapy agents or tumor presence in close proximity to cranial nerves might lead to hearing deterioration. In child HNC, ototoxicity or RT affects the auditory apparatus. According to Grewal et al., adequate diagnosis and pharmacological agents could prevent or reduce ototoxicity in children [51]. Hearing loss in adults is related to HNC and different operative techniques can be used. Hoshikawa et al. used a rolled-up skin graft with temporal muscle flap to maintain hearing [52].

Without adequate wound care and routine dressing cleaning, inflammations and irritations might occur. Infection spread should be always carefully evaluated. Nowadays, thanks to improved surgical reconstructions, most head and neck structures and organs can successfully be restored. Patients after CRT have a greater risk of infections, wound irritations, vessel arteritis and those factors combined with lack of oxygen, history of tobacco use and malnutrition leads to complicated wound healing. It seems that patient care and dressing changing leads to improvement in patients' QOL. Fistula forming and carotid artery ruptures are always resolved in life-threatening episodes [53]. Oral hygiene and the neck dressing's routine check-ups might lead to fewer episodes of

ulceration, necrosis and potential occurrence of suprainfections. Many authors describe the rupture of the carotid artery as the worst complication after HNC treatment. Wound care has a great impact on patients' QOL. Routine and proper wound care can minimize bacterial, fungal and viral infections [54].

Radiation of the head and neck not only results in salivary gland dysfunction, but also leads to a potential mandibular osteoradionecrosis (ORN). Because of the differences in maxilla and mandible vascularization, the mandible is more likely to be exposed to radiation necrosis. Furthermore, dosage, fractionation and the volume of radiation are essential factors of ORN. Because of that, bone exposure, pathological fracture fistula formations and bacterial infections may be present. The hygiene of the oral cavity before and after radiotherapy is very important, and antibacterial prophylaxis should be always considered [55]. Osteonecrosis of the jaws (ONJ) can be minimized with induced oral hygiene and the usage of antibiotics during therapy.

Radiation and chemotherapeutics also might lead to soft tissue irritations and dermatitis, followed by erythema, oedema, ulcerations and formations of fibrous tissues. In some cases, blockage of lymphatic drainage should be evaluated in order to distinguish between oedema and the occurrence of pain.

On the other hand, chemotherapy in HNC patients such as cisplatin, carboplatin, docetaxel, gemcitabine and fluorouracil given intravenously causes not only local head and neck region side effects, but also general side effects. It can be used either alone to relieve from pain and improve patients' QOL if it's not possible to cure the cancer, or used together with radiation before HNC treatment. Chemotherapy has some negative effects on the human body. During HNC treatment, patients have a higher risk of infection, enhanced bruising and bleeding (gum bleeding, bloody skin rashes), anemia, nausea and vomiting, sore or dry mouth, numbness or tingling in hands or feet, changes in hearing or ear ringing, and fatigue. Hair loss in HNC therapy is not so common, but hair thinning might be present.

All these factors, without proper psychological support and therapy, are made in vain. Only with patient support, understanding and communication with the patient, can their QOL in HNC might be improved. A protocol of compassion and support should be used by the entire staff taking part in rehabilitation. It is also very important to understand that cultural and custom differences between patients and nations are also a very important factor. On the other hand, essential skills in communication with patients and their family are

a great matter that should be practiced and trained by care givers. Because of advances in the medicine and therapies of HNC, many different procedures can be carried out among the standard surgeries with CRT.

A study done by Nagy et al., performed on 59 patients at the University of Washington, the Quality of Life Questionnaire and the Head and Neck module of the European Organization of Research and Treatment for Cancer Quality of Life Questionnaire shows that post-treatment maxillofacial rehabilitation in HNC does not only restore physical capabilities but also improves patients' QOL. Because of that, it is necessary to involve trained personnel not only before but also after HNC treatment [56].

Summary

A great number of factors are related to a patient's QOL. Special and individual protocols should be assessed in patients with HNC. Measuring QOL might be troublesome without proper QOL questionnaires.

HNC patients in the terminal stage of their disease require special care and also physical and social well-being, as described by Foxwell et al. In order to fully understand the care at the end of a patient's life, their caregivers and doctors must realize that it is necessary to work together.

HNC patients are always a great challenge for clinicians because of the need of a multidisciplinary approach. It is highly recommended to assist patients in every step of treatment and support their well-being and the psychological aspects of their treatment. In the approach of palliative care in symptom management, pain relief in HNC patients should be performed wisely, even after psychological preparation before the treatment.

A one year survivors QOL study done by So et al., using a review of data from 2000–2011, shows that the importance of QOL is established world-wide. The authors concluded that QOL by 12-months after treatment found that persistent issues such as decreased physical functioning, fatigue, xerostomia and saliva dysfunction still remain. Therefore, more regular clinical assessments should be performed in order to make

routine patient check-ups and improve the patient's QOL [59].

The authors also describe depression and sorrow related to treatment. Depressive symptoms, according to Duffy et al., should be handled to help patients. Other factors are emotional distress and the support that patients receive, which are very important in dealing with therapy [60–62].

According to Rogers et al., HNC patients should also optimize their enjoyment and manage treatment-related barriers to improve treatment and the patient's psyche [63–65]. Also, after confirming the diagnosis, psychological support and early counseling have a huge impact on the patient's QOL, and it is very important to improve the patient's knowledge about cancer and his or her mental condition.

Bjordan et al. performed a study about QOL in 2070 HNC patients, using a simple questionnaire to measure pain, swallowing, senses, speech, social eating, social contact and sexuality [66]. In the result, the usage of the EORTC QLQ-C30 (European Organization of Research and Treatment of Cancer Quality of Life Core Questionnaire) was shown to be a great tool to measure health-related QOL in HNC patients before, during and after treatment with CRT [67].

Studies performed in Poland concerning patient QOL after HNC consisted of a questionnaire evaluation based on the EORTC QLQ C-30 and the EORTC QLQ-H&N35 surveys [68]. Because of the many possibilities to evaluate the patients' QOL, a survey questionnaire performed before and after treatment can greatly measure and evaluate the factors that are strongly affected by surgery or CRT on a patient's well-being. Because of the studies done on cancer patients, it is easier to predict and help newly-diagnosed patients to improve their QOL.

Quality of life is an important factor regarding HNC treatment, and for many is essential for survival. Patients understand more often that treatment will influence their life. Various forms of treatment in different stages of therapy might influence QOL regarding the organs and tissues affected by basic surgery or combined CRT.

We find questionnaire surveys regarding QOL very important for understanding and improving a patient's local and general condition in every stage of therapy.

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