Is the Head and Neck Surgeon an Endangered Species?

Introduction

Head and neck surgeons work largely in the management of patients with head and neck cancer (HNC), which has an incidence of 9257 malignant cases in 2014 in England[1]. They comprise 12.9% (approximately 130 consultants) of the total ENT consultant workforce and 9.4% of oral and maxillofacial surgeons[2]. They work in unison with pathologists, oncologists, clinical nurse specialists, dieticians and speech and language therapists amongst others. Their role in the diagnosis and surgical management of patients is only one part of the different treatment options offered for these cancers. Why then, with the incidence of head and neck cancer on the increase, up from the 2013 figure of 9162 cases and 8916 cases in 2012 and an increase of 11.7% over the last 5 years, is the role of the surgeon under scrutiny. [3,4,5] Changes in the relative importance of risk factors for these cancers, changes to the organisation of health care and the advent of new technology may explain this. This report will address both the risks posed to the head and neck surgeon and also the prospects for the future of head and neck surgery to establish whether the head and neck surgeon is an endangered species.

Risks to the head and neck surgeon

It is important to identify the risks to the head and neck surgeon. These come in various forms. One of these is the potential change in the prevalence of risk factors for head and neck cancer and therefore a potential change in the types of HNC seen, each of which has a different management strategy, some favouring surgery and others not.

Smoking

Smoking is a well known risk factor for head and neck cancer (HNC). In current smokers the largest cohort study has shown smoking to increase the risk by hazard ratio (HR) 5.45 (95% CI 4.22-7.05) in men and 12.96 (95% CI 7.81-21.52) in women in a study carried out in the USA in 2007[6]. A more recent study carried out in the Netherlands found an overall relative risk in both sexes of RR 4.49 (95% CI 3.11-6.48)[7]. With more awareness than ever regarding the health issues posed by smoking, legislation against it and the spiralling costs of purchase in the UK one would think that the numbers smoking would have reduced dramatically, hence lowering the risk of developing HNC. This, however, has not been the case and current figures estimate that between 18-19% of Britons currently smoke[8]. In comparison to 10 years previously when it was estimated around 25% of the population smoked, there appears to be a significant decrease but since 2007 the decrease has actually levelled out with only a modest drop from 2007-2016. Additionally, the percentage of current smokers are highest in the younger age groups with those in their 20's and 30's being the highest sub-group[8]. Although smoking has fallen there is still a substantial proportion of individuals who smoke in the UK. This small reduction in this risk factor in the population is unlikely to threaten the job of the head and neck surgeon who provide one of the management

options for head and neck cancers caused by smoking and this is likely to continue to be a major risk factor for HNC in the future.

Alcohol

A further significant risk factor for the development of HNC is alcohol. The Netherlands cohort study found a dose relationship between alcohol and HNC[7]. This became significant at the 15-30g/day level corresponding to around 2 units per day. In 2014 the opinions and lifestyle survey found that 2.5 million people in the UK drink more than 14 units, enough to cause a significantly elevated risk of head and neck cancer, in a single day and total number exceeding this figure weekly is likely to be significantly larger[9]. The highest proportion of these 2.5 million drinkers again came from the younger age groups with over 1 million coming from those aged 25-44. With the risk from alcohol only reducing to that of a non-drinker after over 30 years of abstinence it is likely that alcohol will continue to be a risk factor for head and neck cancer in future given that most develop these group of cancers in their 40's or older at a time when many are still drinking[7]. Alcohol was shown in the Netherlands cohort study to have the greatest risk of causing oral cavity cancer over oropharyngeal and laryngeal cancer. The main treatment option for oral cavity cancers is surgery and owing to the numbers of drinkers in the UK it is likely that cancer caused by alcohol will continue and therefore require surgery performed by a head and neck surgeon.

Human papilloma virus (HPV)

Another significant future risk for the development of head and neck cancer is human papilloma virus, a large risk factor in the development of cancer of the oropharynx[10]. HPV related cancers are on the increase, mainly due to changes in sexual behaviour, and HPV has been predicted to be the leading cause of oropharyngeal cancer by 2020[11]. It has also been linked with a younger age of onset than cancer associated with smoking or alcohol, although it has been shown to have better treatment outcomes compared to HPV negative cancer[12]. Studies are currently looking at whether HPV positive cancers should be treated differently to HPV negative cancers. This could lead to surgery not being required for those cancers as evidence suggests HPV positive cancers respond better to non-surgical treatment than HPV negative cancers[13]. This could mean that the increase in prevalence of HPV related cancers may have some impact on the workload of the head and neck surgeon.

Furthermore, with the introduction of two HPV vaccines in 2008 for girls aged 12-13 both of which cover HPV-16, the causative agent of most HPV related head and neck cancers, this may lead to a reduction in head and neck cancer in the future, again reducing the workload in those cancers that had previously required surgery[10]. In the UK the immunisation programme currently only routinely immunises young women, although recently NHS England has recommended immunising men who have sex with men[14]. This differs to countries such as the USA, Canada and Australia who now vaccinate both sexes. A recent cost effectiveness analysis in Canada showed vaccination of boys to be cost effective in reducing the cost to treat oropharyngeal cancer[15]. It should be noted that historically men already have an increased risk of developing HNC in comparison to women[1]. The result of vaccinating only one sex may distort this further. The immunisation of young girls may well reduce the incidence of head and neck cancers but only time will tell as follow up of patients

now would tell us little due to the way head and neck cancer develops over many years, and because of the age ranges most commonly affected.

Overall smoking, alcohol and HPV are likely to continue to be important risk factors for the development of HNC, albeit with an increasing importance of HPV. Although surgery is a common management option, current guidelines for HPV positive cancers generally recommend non-surgical management options as first line treatments over surgery and as the frequency of head and cancers caused by HPV increases in the near future this may present a risk to the role of the surgeon.

Reorganisation of services

Head and neck surgeons historically have come to the specialty via a variety of different paths, the majority being from otorhinolaryngology, oral and maxillofacial specialties. This has led to an obvious distinction, but with significant overlap, in the areas that these surgeons operate on, with OMF surgeons operating mainly on the oral cavity and otolaryngologists operating on the nose, pharynx and larynx[16]. Bearing in mind a change in the types of cancer now being seen, more HPV related and affecting the oropharynx and the oral cavity whilst laryngeal cancer has remained static, which surgeons will take these extra cases especially relating to the cancers affecting the oropharynx, a grey area for head and neck surgeons? Will there continue to be a need for the current distinction between head and neck surgeons and therefore will this mean the same number will be needed in future?

Another factor to consider is the decision to centralise head and neck services. This need was highlighted by audits that found that many cancer networks saw fewer than the NICE recommended 100 patients per annum[17]. The centralisation is still in process and could potentially jeopardise the jobs of some head and neck surgeons as cancer networks try to cut costs through efficiency savings in this period of financial difficulty for the NHS. Although it is possible that this is happening, it seems unlikely owing to the fact that currently both OMF surgeons and ENT surgeons do not meet the surgeon to population targets set out by the Royal College of Surgeons, with ENT surgeons currently in a ratio of 1:86,000 surgeons to population compared to 1:50,000 recommended[2]. It therefore seems that the reason for this reorganisation is to improve patient outcomes and reduce costs of operating in multiple sites rather than reducing the size of the workforce as this would clearly be counter-productive to patient care.

The change in management of head and neck cancer

Statistics from the 2014 National Head and Neck Cancer Audit show that over half of all head and neck cancers in the UK were treated with surgery as the initial treatment of choice[18]. However, these figures cover up significant heterogeneity in the treatment of head and neck cancers. For example, 68.5% of patients had surgery for cancer of the anterior two thirds of the tongue whilst 44.3% of oropharyngeal cancers were treated with surgery as first line treatment showing a marked difference between their cancer management. Recent evidence has suggested that the management of these cancers should reflect the changing nature of head and neck cancers, namely the increased proportion of HPV positive cancers. HPV positive cancers have been shown to be more responsive to chemotherapy and

radiotherapy which explains the lower use of surgery in oropharyngeal cancers already, many of which are caused by HPV[13]. In fact, 71.8% of those diagnosed with oropharyngeal cancer who were tested for HPV in 2014 had a positive result[18]. Research has also shown that HPV positive cancer patients have a better survival rate compared to HPV negative cancers and has led to thoughts that perhaps a lower dose of chemoradiotherapy would be suitable[13]. This shifts the management even further away from the surgical options for the growing number of people who test positive. Lowering of these doses makes chemotherapy and radiotherapy in combination an even more acceptable option due to the potential of reducing the morbidity through the side effects these treatments pose. This may in turn jeopardise a large proportion of the surgeons working in this area. Furthermore, improvements in radiotherapy over the last decade, such as intensity-modulated radiotherapy, have led to a decrease in side effects, for example xerostomia, without compromising the dose of radiation the tumour and making this treatment option increasingly favoured[19].

Additionally, non-surgical treatment options, like radiotherapy, can allow for speech preservation in advanced laryngeal cancers while total laryngectomy cannot. These benefits in favour of non-surgical curative options over surgery has led to a reduction of surgical practice, especially open surgery in recent times. There is, however, some controversy surrounding non-surgical options with several studies finding that those patients treated with chemoradiotherapy in advanced laryngeal cancer, may have a higher risk of mortality compared to those treated with a total laryngectomy[20,21]. This lack of clarity in best treatment options means that, as the above statistics show, surgery still has a prominent treatment role in all the above cancers and this will continue to be the case until robust studies confirm otherwise.

In the management of some cancers, surgery is still considered a first line option but surgical practice has had to change in order to still present itself as a credible management option. The development of transoral laser micro-surgery for early laryngeal cancer has provided a surgical alternative to the previously preferred method of radiotherapy and now 39% of patients were treated with micro surgery first line for early laryngeal cancer[18]. Both micro-surgery and radiotherapy have been given equal place as first line management options for this cancer and have been shown to be to be equally effective in the most up to date Cochrane systematic review showing no statistically significant benefit for either treatment modality[22]. Clearly further research is needed in this area and results could either strengthen or undermine the importance of head and neck surgery.

Whilst there is a reduction in surgery for some cancers and a change of practice of surgery in others, not all cancers are treated with chemotherapy and radiotherapy. Conventional surgical practice is still used as the modality of choice in some head and neck cancers such as cancer of the oral cavity where resecting tumours can be less destructive in comparison to other head and neck cancers and where large radiation doses, in order to be curative alone, can cause severe side effects, for example causing nutrition problems for patients due to mucositis[23]. Additionally, sinonasal tumours are treated in most cases with surgery as first line treatment. Much like tumours of the oral cavity, sinonasal tumours lie in close proximity to structures easily damaged by high doses of radiation such as the eye[24]. Surgery

therefore, is first line treatment with radiotherapy being used as an adjunct post-operatively if required, rather than on its own with curative intent.

The use of chemoradiotherapy has had a large impact on the management of head and neck cancer. One result of this has been the increase in need for salvage surgery, performed if chemoradiotherapy fails or there is a reoccurrence, and has shown to have good results. For example, in recurrence of laryngeal cancer, studies have found benefit not just from total laryngectomy but also from partial laryngectomies that can offer better functioning for the patient with good survival outcomes in selected patients[25]. New guidelines for recurrent head and neck cancer suggest surgery as a viable option for all head and neck cancers[26]. Other salvage options are limited, such as chemotherapy, due to inferior survival outcomes compared to surgery, and radiotherapy due to toxicity. This means that currently surgery provides the main salvage approach. This changing, but complex role of the head and neck surgeon means that they are still needed even if they have less of a role in the initial management in the future.

Head and Neck surgeons are not just involved in the curative management of cancer patients. They can have an important role in palliative treatment too. Surgeons can help to reduce the symptoms of disease in some cases by debulking tumours and offering a tracheostomy in appropriate cases[27]. Although not necessarily extending patient life, they can make a real difference in improving a patient's quality of life at this time and without them patients with incurable cancers may suffer a more uncomfortable death.

The future of head and neck cancer management

New technologies for surgeons with the aim of keeping them at the forefront of treatment for head and neck cancer have been developed. The development of trans oral robotic surgery (TORS) has led to much promise. This allows for tumour removal through the mouth to areas of the head and neck that previously could only be accessed via open surgery. This leads to a reduced morbidity and shorter recovery times[28]. Although robotic surgery is available and has shown to yield good surgical results compared to the current standard of treatment, clinical commissioning policy from NHS England has decided not to routinely commission this service[29]. Their decision was based on a lack of randomised controlled trials in this area. Perhaps in the future once these studies have been obtained, NHS England may reconsider its decision leading to a further change to the face of surgery and may well tilt the balance of management of many head and neck cancers back in the favour of surgery. The prospects for surgery in future are huge with laryngeal transplants a real possibility, but surgery is not the only modality developing for the future[30]. As understanding of the molecular basis of how head and neck cancer develops, so too are the treatment options available. Already research into the use of nanoparticles to diagnose, identify biomarkers and potentially deliver drugs to a specific area, and therefore reduce the off target effects of current treatments, may become possible[31]. Furthermore, drugs to increase the response to radiotherapy are being researched with the hope of reducing the dosage of radiotherapy needed for curative intent and therefore reducing side effects[32]. The question is whether the advances in surgery outstrip those in other treatment modalities.

Conclusion

Currently, surgery forms a key part of the multidisciplinary approach to treatment of many head and neck cancers and therefore the role of the surgeon is still crucial. The stagnating decline in smoking popularity, the long abstinence period required to negate alcohol risk and the rising prevalence of HPV all suggest that head and neck cancer rates are unlikely to fall significantly. However, the role of the head and neck surgeon could be in jeopardy as the proportion of chemoradiotherapy sensitive HPV positive cancer increases and new competitive therapies emerge. Only with the workforce training and adequate funding, allowing new surgical approaches to become mainstream, will the speciality of head and neck surgery continue to flourish. Head and neck surgeons need to embrace all treatment advances to improve patient care but specifically strive to develop new surgical approaches to compete with the non-surgical advances and to improve outcomes further in head and neck cancers.

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