Chapter 1
Overview of "Head & Neck Cancer: Current Perspectives, Advances, and Challenges"

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Content

Abstract Cancers arising in the Head & Neck region are a complex group of diseases which require equally complex approaches to diagnose and treat. There is a common misconception that these are self inflicted cancers due to life style choices such as the use/abuse of alcohol and tobacco products. This volume is intended to help educate the reader about the many facets of these diseases and to provide a broad overview of this discipline. While this volume is written such that it can be understood by readers of all levels of education, it still has the content and details that professionals seek in order to stay abreast of this changing field. It should be refreshing to readers to find a volume like this one which explains in great detail many aspects of cancer biology and treatment methodologies, many of which can be applied to cancers arising throughout the body, in a way that is easily understood. In a similar fashion, readers should walk away with a sense of having their preconceived notions of Head & Neck cancer permanently changed, based on the data presented, along with thought provoking concepts that can be applied outside the field of Head & Neck cancer.

Keywords Head • Neck cancer

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1.1 Introduction

This volume starts out with a chapter exploring the evidence for Head & Neck cancer existing well before commercial tobacco and alcohol, (two of the longest linked causative agents to these diseases), were available. In some cases, both considerable temporal and geographical separation existed for these two causative agents, yet there is evidence in the records for patients presenting with Head & Neck cancer back to antiquity. We then explore the current modern state of the frequency and distribution of these diseases in various patient populations. It is important to understand who gets these diseases so that we can target screening and prevention programs, which is the next topic to be discussed.

We then take a step back to explore the human anatomy of the head and neck region, and address the pertinent anatomical sites as they are grouped in segments that are important to the treatment and diagnosis of these diseases. This chapter lays the foundation, for locating the exact anatomical structures in which these tumors arise, and is applicable for all of the remaining chapters. The first application of the anatomical review is presented in the next chapter, which outlines how to perform a proper patient examination to determine if a patient has Head & Neck cancer.

Some patients that are screened do present with abnormalities. In the subsequent chapters, we learn that not every nodule and abnormality is Head & Neck cancer, how to differentiate what they could be, and the follow-up actions that need to take place. We then explore the pathological presentations of the spectrum of disease states that are related to Head & Neck cancer. These need to be understood in order to make the proper diagnosis of lesions that are in fact cancerous. Two chapters are directed at delving into the pathology of the most common type of Head & Neck cancer, followed by a chapter on rarer tumors. We then address how a special branch of pathology, cytopathology, connects with screening efforts, and initial diagnosis of Head & Neck cancers, along with its link to traditional pathology.

Using the pathological background that is presented, we use that background to start to explore the link between Head & Neck cancers and cervical cancer. One may wonder why this is important and/or relevant in a book focused on Head & Neck cancer, but the answer is simple and not realized by many outside the field. Cancers arising in these two sites share considerable overlap in their biology, pathology, viral associations, and many other connections, such that there is a growing body of scientific literature that uses them interchangeably and/or simultaneously in the same scientific manuscript. Discoveries at all levels from basic research to diagnosis and treatment, readily flow from one cancer site to the other. It is ironic, that in light of these strong overlapping similarities of the cancers arising in these two anatomical regions, that funding agencies resist funding research projects that are not dedicated to their particular anatomical region. We learn from this chapter that policy makers, researchers, and funding agencies would benefit patients presenting with these tumors, keeping in mind that an advance made for one disease site is an advance made for the other.

The next several chapters discuss the role that viruses play in Head & Neck cancers, as well as the complex interplay of various microorganisms, host genome expression, and a number of other factors that promote tumor growth. We then explore the role of nutrients in not only the prevention of Head & Neck cancer, but also its role in helping patients recover from their tumors, as well as its link to survival.

The next several chapters are directed at helping the reader to understand what considerations are taken into account in order to produce a treatment plan for patients with Head & Neck cancer. This is followed by chapters that define the role of medical oncology in treating this group of tumors, as well as one that outlines the role of surgical interventions. We then take a look at how diagnostic technologies are applied to more accurately stage and assist the treatment team in treating Head & Neck cancer patients. Considerable time is spent on why some diagnostic methods are better in particular situations, and how the technologies work. This leads us to the next most common treatment, radiotherapy, and how it is applied to these patients.

One technology that lends itself very well to the treatment of Head & Neck cancers is the use of various lasers. In this chapter, and a related chapter that uses compounds activated by laser light, we see how these once exotic technologies are becoming more commonplace in the arsenal of methods to treat Head & Neck cancer.

We then explore the reconstruction of the patient that has been scared both physically and mentally by these diseases and/or as a result of their treatments. We also look at the most common complications of the treatments used on these patients. This is done with the thought that if one knows what negative outcomes can result from a given treatment course, those facts can help guide treatment planning on a patient by patient basis to best avoid them. We then turn to the mental healing that some patients need and highlight for health care providers and family members the mental issues that may be burdening these cancer patients. As with other cancers, these patients struggle with the mental burdens of their possible loss of function, disfiguration, quality of life, and possibly shortened life span. How practitioners and family members can address these issues are covered in this chapter.

A chapter is presented to demystify how cancer drugs and clinical trials are conducted. Having a clear understanding of the overall process by patients, practitioners, and family members will help to clarify the misconceptions related to investigational drugs. This leads us to a chapter describing how currently used drugs work, as a well as a new promising agent to treat Head & Neck cancers. Since cancer is really an immune deficiency disease (because the patient's immune system cannot keep the tumor growth subclinical), we explore a chapter on the immune system and how that has led to a class of antibody-based treatments.

Mitochondria are small organelles within both normal and tumor cells. They are in part responsible for the energy production of the cell. Comparatively new research findings are pointing to this organelle as being a key element in the development and progression of Head & Neck cancer. Drugs directed at acting on key elements to alter the function of mitochondria in tumor cells have recently entered into human

clinical trials. A chapter highlighting the importance of this new body of work, and how it relates to Head & Neck cancer, is presented.

No volume on Head & Neck cancer would be complete without addressing the genetic aspects of these diseases. Similarly, the emerging role of biomarkers as tools to diagnose and as treatment targets are discussed. The comparatively new field of microRNAs is defined, and their possible roles in Head & Neck cancers are outlined.

Finally, we end this volume with the idea that the future is now, with the reduction of a dream to reality. It has long been hoped that early, easy, and affordable methods would be developed to screen patients and identify those patients at early stages of oral cancer, when these diseases are much more amenable to treatment. The use of saliva as a readily available biofluid is being using to detect different types of biological markers to identify early stage cancers. It is anticipated that these advances will propel similar technologies to the market place, and forever change the way Head & Neck cancer patients are treated.

It is essentially impossible to cover every aspect of Head & Neck cancer, as each of the chapters in this volume could be book in and of themselves. That being stated, it is hoped that the reader will gain a broad view of the many overlapping facets related to Head & Neck cancer and be more versed in this complex field after reading this book.