The Journal of Laryngology & Otology (2015), ***129***, *535–539*.

doi:10.1017/S0022215115001218

REVIEW ARTICLE

Surgical treatment of head and neck cancers in the ancient world

J KELLY[1], S MAHALINGAM[2]

[1]*Department of Trauma and Orthopaedic Surgery, Princess Royal Hospital, Brighton and Sussex University Hospitals NHS Trust, and* [2]*Department of Otolaryngology, East Surrey Hospital, Surrey and Sussex Healthcare NHS Trust, UK*

Abstract

Objective: This paper attempts to chart the history of head and neck cancers and their surgical treatment, starting from ancient Egypt and concluding with Galen.

Conclusion: The ancient Egyptians appear to have treated head and neck cancers with local applications. The ancient Greek corpus contains a reference to treating pharyngeal carcinoma with cautery, but the description is too vague to establish the diagnosis conclusively. The ancient Romans moved away from surgical treatments, with Galen establishing a prejudice against surgery that would last through the Middle Ages.

Key words: Head And Neck Neoplasms; History, Ancient

Introduction

There have been a scattering of recent studies exploring the history of head and neck cancers and their surgical treatment.[1,2] These tend to make very brief mention of the ancient world, starting their main discussion from the early modern period.

What follows is an attempt to chart the history of head and neck cancers and their surgical treatment, starting from ancient Egypt and concluding with Galen.

Ancient Egypt

The Egyptians were renowned throughout the ancient world for their medical knowledge, and there are numerous references in Greek and Roman literature to their skills in the field. Homer says of Egypt:

> … there the earth, which bears forth grain, gives the greatest store of drugs, many of which are healing when mixed together, and many of which cause harm. There, every man is a physician and wise about all men – for they are the race of Paieon.[3]

Paieon was the doctor to the Olympian gods, identified sometimes with Apollo and sometimes with Asklepios. These lines are therefore testament to the high regard in which Egyptian doctors were held. Unfortunately, the number of references to Egyptian medicine in later literature greatly outnumbers the primary sources.[4]

The two most important documents discovered so far are the Edwin Smith Papyrus, which dates from around 3000 BC, and the Ebers Papyrus, which dates from around 1500 BC.[4] There are some interesting points of similarity in form and content with the Hippocratic treatises, suggesting their influence on Greek medicine.[5] The Edwin Smith Papyrus constitutes the earliest known description of cancer, with a passage on the diagnosis and treatment of breast cancer.[6]

The Ebers Papyrus (Figure 1[7]) features a much broader array of cancers, and of particular interest to us is the inclusion of oral cancer and tumours of the neck.[8] However, it is difficult to judge the nature of the tumours described, as the descriptions are typically scant. The following is one of the more detailed descriptions:

> When thou meetest a mattery-tumour in the neck of a grown-up man, it forms an elevation, brings forth fleshy masses of matter and lasts years or months; matter comes forth therefrom like fluid from a Stickleback-fish or the Great Scorpion, then say thou: 'He has a mattery-tumour. I will fight the disease'.[9]

The treatment prescribed is a poultice composed of 'wax, cow's fat, xet-plant, writing-fluid, teun-plant, caraway, copper-shavings, verdigris, fresh lead-earth, sea-salt, goose-fat, incense-berries and collyrium'.[9]

The Ebers Papyrus is the only complete text from what was once a collection of 42 papyri, known to

Accepted for publication 8 December 2014 First published online 25 May 2015

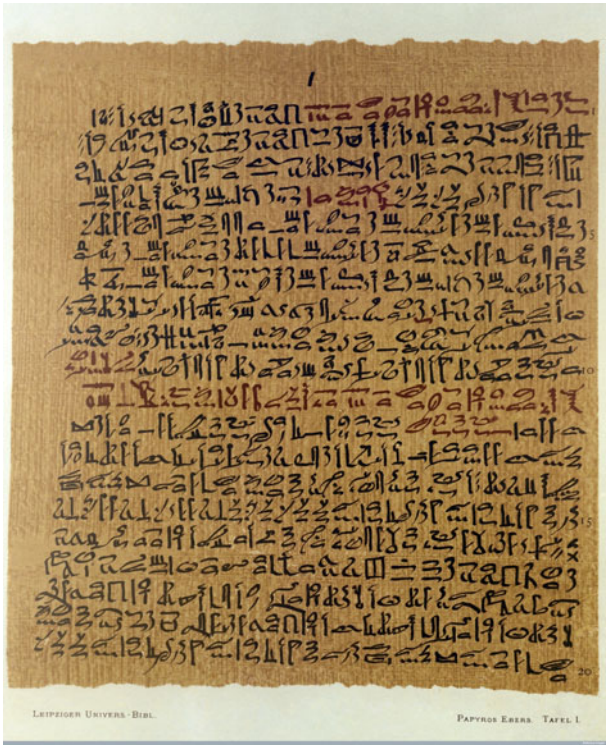

FIG. 1
Reproduction of the Ebers Papyrus.[7] Courtesy of the Wellcome Library, London, UK.

the Greeks and Romans as the Hermetic Books.[4] Clement of Alexandria claimed that these texts contained the whole sum of human knowledge, but the Ebers Papyrus is the only major text to survive. There are a number of more minor papyri, along with a great array of inscriptions and medical instruments.

Interpreting these sources is beset by significant difficulty. With the exception of the Ebers Papyrus, the texts are fragmentary, and the passages which can be deciphered seem often to be contradictory, even within the same papyrus. At a more fundamental level, the interpretation of hieroglyphic and hieratic texts is difficult and there still remains significant disagreement over meanings.[4]

The surgeons

The most likely candidate for the word 'doctor' has been identified as 'swnw'.[4] The hieratic script is a syllabary – a writing system in which consonants are recorded but vowels are not. Therefore, it is difficult to know how 'swnw' would have been pronounced, but 'suw nu' appears to be the most likely option.[4]

Herodotus noted that Egyptian doctors were highly specialised, saying:

> Medicine is so specialized among them that each doctor is a healer of a single disease and no more. The whole country is full of doctors: some of the eyes, some of the head, some of the teeth, some of matters relating to the abdomen, and some of internal diseases.[10]

FIG. 2
Amulet depicting Sekhmet, Egypt, circa 4000 BC. Courtesy of the Wellcome Library, London, UK.

It would therefore be surprising if surgeons were not considered a separate profession at that time, and there is, indeed, strong evidence to suggest that this was the case. Surgeons have been identified as the priests of Sekhmet (Figure 2) – a lioness-headed figure who was the goddess of war and death, but appears also to be associated with healing in Egyptian popular culture.[11] Many Old Kingdom texts describe her priests as 'swnw', suggesting that they were medically qualified.[11]

The Edwin Smith and Ebers papyri talk of both 'swnw' and the priests of Sekhmet as being able to diagnose disease, suggesting that they were separate but related professions. It may also be significant that the Edwin Smith Papyrus, which is predominantly surgical in nature, describes the priests of Sekhmet before the 'swnw', while in the Ebers Papyrus, which is more medical in content, their position is reversed.[12]

Whether surgeons subspecialised is less clear. There is limited evidence that some priests of Sekhmet primarily treated diseases of the head.[12] One of these priests, Ni-Ankh-Sekhmet, has been called the first rhinologist in history.[13]

The relative importance of ENT surgery in ancient Egypt is hard to judge. An agrarian and warlike society might be expected to need orthopaedic surgeons much more than ENT surgeons. However, of the 48 surgical cases detailed in the Edwin Smith Papyrus, 33 deal with head and neck diseases. The anatomical knowledge displayed is relatively advanced, and some of the treatments suggested, such as the reduction of dislocated jaws, are consistent with modern treatments.[13]

Head and neck cancers

While the Edwin Smith Papyrus makes reference to 'tumours' of the chest wall, it makes no mention of cancers of the head and neck. The Ebers Papyrus, on the other hand, mentions several 'tumours' of the head and neck. For most of these 'tumours', it suggests the application of poultices only. For those that are

https://doi.org/10.1017/S0022215115001218 Published online by Cambridge University Press

particularly 'soft' it recommends surgical excision, which should take care to avoid blood vessels. For 'tumours of the vessels' in any part of the body, it suggests surgical excision followed by cautery. However, it is very difficult to ascertain just what these 'tumours' refer to.

It can be said that ancient Egyptian surgeons, then, had some acquaintance with head and neck cancers, and suggested a mixture of local poultices, excision and cautery. However, there is no sophisticated method of distinguishing between various types of 'tumour', and nothing is said of the aetiology of any of these growths.

Ancient Greece

Hippocrates

Hippocrates was a contemporary of Socrates and Plato, and was the first Greek physician to devote special attention to cancers, although the proportion of the Hippocratic corpus which discusses cancers is relatively small.[14] Of the many treatises which survive under his name (Figure 3[15]), only a few are likely to have been written by him. The others are probably attributable to unnamed physicians who lived within a generation or two of Hippocrates, in the fourth and fifth centuries BC.[16]

These treatises demonstrate no greater knowledge of anatomy or surgical management, although they date some thousand years later than the more modern of the Egyptian papyri. However, their greatest advance was to separate medicine from religion.[5] The Hippocratic treatises dispense completely with the incantations that are scattered throughout the Egyptian papyri, and they propose an entirely rational aetiology for disease. This was the humoral theory, which suggested that the excess or deficit of bodily humours, such as blood, mucus and bile, was responsible for the development of disease, including cancers.[16]

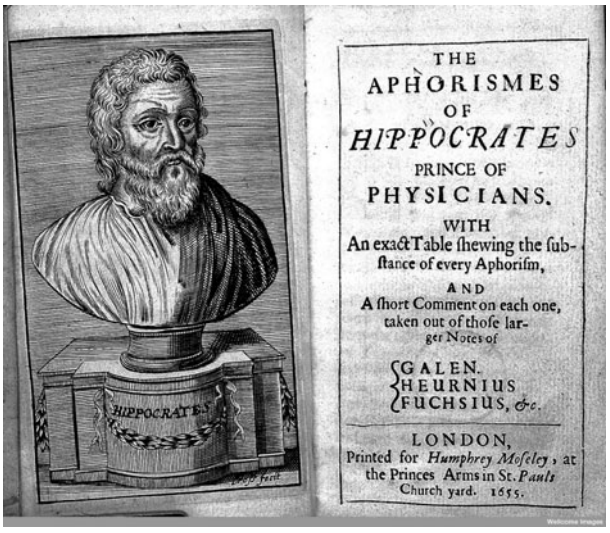

FIG. 3
Title page and frontispiece of an English text of *Aphorisms of Hippocrates*.[15] Courtesy of the Wellcome Library, London, UK.

Hippocrates has given to modern medicine much of its terminology about cancer. He remarked that growths reminded him of a moving crab, which led to the terms 'carcinos' for a tumour, 'carcinoma' for a malignant tumour and 'cancer' for a non-healing malignant tumour.[14] He also distinguished hard tumours, which he called 'scirrhus' tumours, from soft tumours.[14]

Hippocrates suggests that the most difficult cancers to treat are those of the axillae, the flank of the body, and the thigh.[17] He instructs physicians not to surgically excise any cancers that have not ulcerated, suggesting that they are incurable and that any surgical intervention could hasten death.[17] He holds the same true for any deep-seated or occult tumours, saying: 'It is better not to try any treatment for occult cancers, for, if treated, the patients die quickly, but if not treated, they go on for a long time'.[18]

Hippocrates sums up his recommendations for treating cancers by suggesting that if tumours cannot be cured by local poultices alone, physicians should try surgical excision. If surgical excision fails, physicians should try cautery. If this fails, then the tumour is incurable.[17]

Head and neck cancers

Hippocrates and his followers make specific mention of a number of cancers, and among them include three references to head and neck cancers.[14] In *On Diseases*, which is unlikely to have been written by Hippocrates himself, lesions at the base of the tongue are described and nasal polyps are differentiated from nasopharyngeal carcinoma.[19] In *Epidemics*, which is also unlikely to be by Hippocrates, the author describes a pharyngeal carcinoma and suggests that cautery be used, claiming this to have been successful in his experience.[20] However, there is insufficient detail provided to be sure if the 'tumour' being discussed is a malignancy at all.[21]

The Hippocratic corpus, then, introduces into medicine the terminology for cancers still in use today. It mentions the successful treatment of what is called a pharyngeal carcinoma with cautery, but does not supply sufficient detail to state with confidence that the mass being described is truly a carcinoma.

Ancient Rome

When Greece was incorporated into the Roman Empire in 146 BC, many Greek physicians moved to Rome. Julius Caesar helped to introduce a law in 46 BC which granted citizenship to all Greek doctors in Rome.[22]

Celsus

The most notable Greek physician to claim citizenship in this way was Aulus Celsus. He moved to Rome in the middle of the second century BC, and made Latin the new language of medicine with his *De Medicina*

https://doi.org/10.1017/S0022215115001218 Published online by Cambridge University Press

(Figure 4[23]).[24] This work is perhaps most notable for its detailing of the four cardinal signs of inflammation. It also moves away from the Hippocratic humoral theory, entertaining more complex pathoaetiologies.[22]

De Medicina describes several cancers, and introduces the earliest surviving systematic classification of breast cancer. It suggests the use of topical applications for superficial cancers with a mixture of cabbage, honey, egg white and fig. Deeper cancers should be treated aggressively with surgery. Several types of cancer are described, including cancers of the face, mouth and throat. He advocates reserving surgery for cases where there is significant impairment of function. For example, he holds back surgical excision for cancer of the lip 'if they have been contracted too much, and there is a loss of their necessary function, and it becomes less easy both to take food and speak clearly'.[25] Celsus also describes nasal polyps, and says '… these are often cancerous, and therefore should not be touched'.[26] Celsus gives little in the way of detail about his surgical technique for the excision of any cancer.[17]

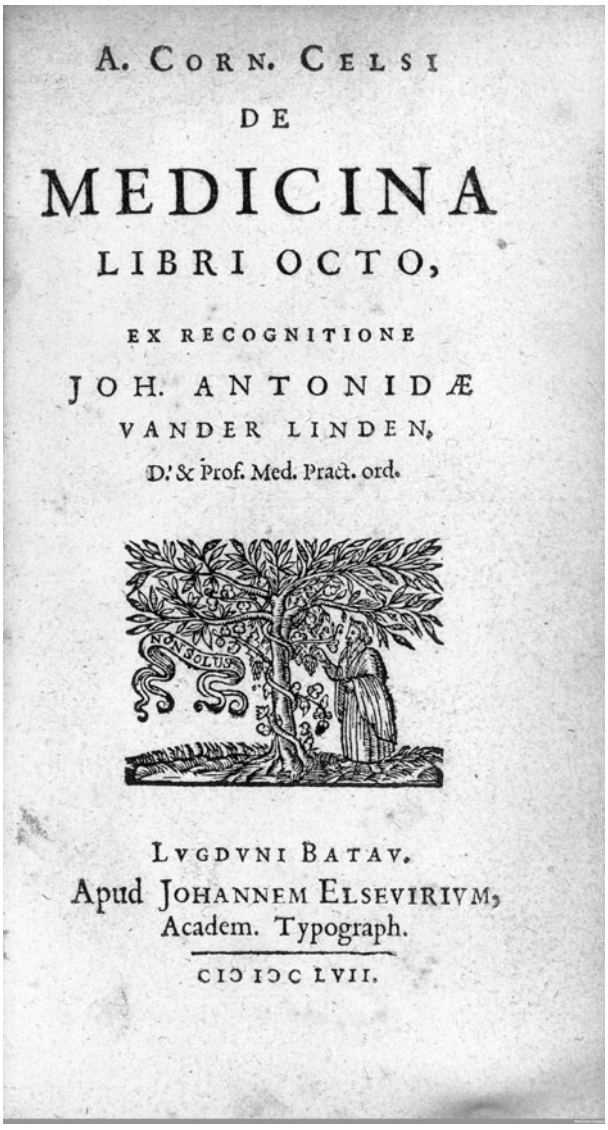
A. CORN. CELSI
DE
MEDICINA
LIBRI OCTO,
EX RECOGNITIONE
JOH. ANTONIDÆ
VANDER LINDEN,
D. & Prof. Med. Pract. ord.
NON SOLUS
LVGDVNI BATAV.
Apud JOHANNEM ELSEVIRIVM,
Academ. Typograph.
CIↃ IↃC LVII.

FIG. 4
Title page of the eighth book of Celsus' *De Medicina*.[23] Courtesy of the Wellcome Library, London, UK.

FIG. 5
Galen dissecting a pig. Woodcut from a Venetian edition of Galen's *Opera Omnia*.[27] Courtesy of the Wellcome Library, London, UK.

Galen

Celsus' most influential successor was Galen (Figure 5[27]), who lived in the second century AD. He devoted an entire work to the categorisation of tumours. He returns to the humoral theory, suggesting that incurable cancers form from residues of black bile, and curable ones from excesses of yellow bile.[16] Consequently, he proposes that physicians should try to 'thin' the blood before attempting to treat cancers, with the aid of purgatives to remove bile.

Because he saw cancer as a systemic disease caused by imbalances of the humours, Galen argues that it requires systemic treatment foremost, rather than surgical intervention. He suggests that surgery is best avoided for head, neck and back cancers, and should be reserved for breast, uterine and pharyngeal cancers.[17] In these latter cancers, the affected part is to be excised and the surrounding tissue cauterised until bleeding stops.

Head and neck cancers

Celsus and Galen both describe the surgical excision of head and neck cancers. However, the great prominence Galen gave to the humoral theory made surgery at most an adjunct to the medical management of systemic disease. Galen was to prove far more influential than Celsus, and subsequent generations of physicians moved even further away from the surgical treatment of cancers.

Conclusion

The history of ENT surgery has a venerable beginning, some 5000 years ago. It seems very likely that the ancient Egyptians studied and treated head and neck cancers, although the treatments described are non-surgical. The ancient Greek corpus contains reference to the use of cautery to treat a pharyngeal carcinoma, but there is insufficient information to judge whether

https://doi.org/10.1017/S0022215115001218 Published online by Cambridge University Press

this is likely to have been an accurate diagnosis. Celsus proposes the surgical treatment of head and neck cancers when they cause functional impairment, but is generally cautious about attempting surgery. Galen's rigid application of the humoral doctrine led to a prejudice against surgical interventions. This was to persist through the Middle Ages, and was compounded by the Church's prohibition against surgery in the thirteenth century.[2] Little, if any, progress was to be made in surgery until the more enlightened Renaissance ushered in a new interest in anatomy and surgery.

The Renaissance is so called because it was a rebirth of classical civilisation through the discovery of ancient texts. These included the medical and surgical texts of the ancient world. A history of any aspect of Western medicine thus starts in the ancient world and continues to modern day – albeit with a long period of relative dormancy from the fall of the Roman Empire to the beginning of the Renaissance. The history of head and neck cancer surgical treatment is no different, and the modern ENT surgeon is part of a continuous tradition stretching back around five millennia.

References

1 Folz BJ, Silver CE, Rinaldo A, Fagan JJ, Pratt LW, Weir N *et al*. An outline of the history of head and neck oncology. *Oral Oncol* 2008;**44**:2–9
2 McGurk M, Goodger NM. Head and neck cancer and its treatment: historical review. *Br J Oral Maxillofac Surg* 2000;**38**: 209–20
3 Homer. The Odyssey. IV. In: Monro D, ed. *Homer. v. 3*. Oxford: Clarendon Press, 1901;228–32
4 Allen JP, Mininberg DT. *The Art of Medicine in Ancient Egypt*. New York: Metropolitan Museum of Art, 2005
5 Saunders JB. *The Transitions from Ancient Egyptian to Greek Medicine*. Lawrence, KS: University of Kansas Press, 1963
6 Breasted JH. *The Edwin Smith Surgical Papyrus*. Chicago: University of Chicago Press, 1930
7 *Ebers Papyrus*. Leipzig: W Englemann, 1875
8 Bryan CP, Smith GE. *The Papyrus Ebers*. London: Geoffrey Bles, 1930
9 Bryan CP, Smith GE. *The Papyrus Ebers*. London: Geoffrey Bles, 1930;145
10 Herodotus. Histories. II. In: Hude K, ed. *Herodotus Historiae. v. 1*. Oxford: Clarendon Press, 1927;84.1
11 Veiga PA. *Health and Medicine in Ancient Egypt: Magic and Science*. Oxford: Archaeopress, 2009
12 Sullivan R. The identity and work of the ancient Egyptian surgeon. *J R Soc Med* 1996;**89**:467–73
13 Pahor AL. Ear, nose and throat in ancient Egypt. *J Laryngol Otol* 1992;**106**:677–87
14 Karpozilos A, Pavlidis N. The treatment of cancer in Greek antiquity. *Eur J Cancer* 2004;**40**:2033–40
15 *Aphorisms of Hippocrates*. London: Humphrey Moseley, 1655
16 Jouanne J, Allies N, van der Eijk P. *Greek Medicine from Hippocrates to Galen: Selected Papers*. Boston: Brill, 2012
17 Papavramidou N, Papavramidis T, Demetriou T. Ancient Greek and Greco-Roman methods in modern surgical treatment of cancer. *Ann Surg Oncol* 2010;**17**:665–7
18 Hippocrates. Aphorisms VI. 38. In: Jones W, ed. *Hippocrates. v. 4*. Cambridge: Loeb Classical Library, 1931;38
19 Potter P, ed. *Hippocrates. v. 6*. Cambridge: Loeb Classical Library, 1988
20 Jones W, ed. *Hippocrates. v. 1*. Cambridge: Loeb Classical Library, 1923
21 Retief FP, Cilliers L. Tumours and cancers in Graeco-Roman times. *S Afr Med J* 2001;**91**:344–8
22 Jackson R. *Doctors and Diseases in the Roman Empire*. London: British Museum Publications, 1988
23 Celsus. *De Medicina*. Leiden: Johann Elzevier, 1657
24 Spencer W, ed. *Celsus. v. 1*. Cambridge: Loeb Classical Library, 1935
25 Celsus. De Medicina VII. In: Spencer W, ed. *Celsus. v. 3*. Cambridge: Loeb Classical Library, 1938;9
26 Celsus. De Medicina VI. In: Spencer W, ed. *Celsus. v. 2*. Cambridge: Loeb Classical Library, 1938;8
27 Galen. *Opera Omnia*. Venice: Heirs of LA Junta, 1565

Address for correspondence:
Dr James Kelly,
Department of Trauma and Orthopaedic Surgery,
Princess Royal Hospital,
Haywards Heath RH16 4EX, UK

E-mail: james.kelly6@nhs.net

Dr J Kelly takes responsibility for the integrity of the content of the paper
Competing interests: None declared