

HISTORY OF ONCOLOGY

Management of penile tumours during the Byzantine period

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Summary

While conventional treatment of penile cancer consists of total penile amputation and bilateral lymphadenectomy, recently a more conservative strategy comprising penile-preserving surgery and selective lymphadenectomy has been applied in order to preserve the penis and to minimize unnecessary inguinal lymphadenectomy. A thorough literature survey was performed to see what was already known of the surgical treatment of penile tumours in ancient times. In the Byzantine period, surgery appeared to have been highly developed, as one may conclude from the surgical material included mainly in the works of Oribasius of Pergamus and Paul of Aegina. Being aware of cancer, they described in their medical encyclopaedias malignant and benign tumours of the prepuce and glans penis, as well

as their surgical and non-surgical management. After local excision of malignant tumours, they strongly recommended burning to prevent relapse, whereas they discouraged simultaneous removal of external and internal preputial lesions, because of the risk of perforation of the prepuce. These surprisingly detailed descriptions prove that Byzantine surgery had reached a higher level than commonly supposed. Penile-preserving treatment, which has recently become the therapeutic strategy of choice, was already accomplished in ancient times by using adjuvant thermal or chemical burning after local tumour excision.

Key words: Byzantine surgery, Oribasius, Paul of Aegina, penile cancer

Introduction

The rarity of penile tumours has led to relatively slow progress in the evolution of diagnostic/staging procedures, understanding of risk factors, and development of treatment modalities. While conventional routine treatment of penile cancer consists of total penectomy and bilateral inguinal lymphadenectomy, during the last decades a more conservative strategy has been applied in an attempt to preserve the penis and to minimize unnecessary inguinal lymphadenectomy with refinements in inguinal staging procedures, mainly by sentinel lymph node biopsy [1]. Organ-preserving surgery can now preserve as much penile tissue and functional integrity as possible, without compromising oncological control [2]. This minimizes the impact of disease and

its treatment on the quality of life of the patient. Recently small superficial tumours have been treated successfully with laser ablation or radiotherapy, while poorly differentiated or more deeply infiltrative tumours involving the cavernous bodies and the distal shaft are preferably managed by partial penectomy excising 0.5-1 cm of normal tissue proximal to the tumour. This should leave a stump of penis to allow directable micturition in a standing posture, with some coital functions as well. Total penis amputation with perineal urethrostomy should be performed only for bulky invasive tumours involving the base of the penis [1-3].

With our interest in medical history, we considered it interesting to examine what was already

known about the treatment of penile tumours in ancient times. During the Byzantine period (3rd century until the fall of Constantinople in 1453) there was a continuous series of physicians who compiled, standardized and enriched the medical knowledge of their Greco-Roman predecessors. Their medical encyclopaedias formed the basis of Arabic medical knowledge and remained standard textbooks in Western medicine until the Early Modern period (from the 16th until the end of the 18th century). Byzantine surgery appeared to have been highly developed, as one may conclude from the surgical material included mainly in the works of Oribasius of Pergamus and Paul of Aegina.

Methods

A thorough literature survey was performed to identify data regarding penile tumours in the Byzantine period. Original Greek manuscripts of the most eminent Byzantine physicians, including Oribasius of Pergamus, Aetius of Amida, Paul of Aegina and Alexander of Tralles were studied. Several references to penile tumours and their management were found in Paul's and Oribasius' works [4,5].

Results

Oribasius dedicated two distinct chapters of his medical encyclopaedia for the description of thymi (i.e. penile tumours). In the first one (Figure 1), not only he defined thymi: *"Thyme is a very fleshy ulcer which is developed on the genitals, on the anus or elsewhere. The benign form is usually automatically discarded, but the malignant one, if cut becomes worse (i.e. more malignant), painful and starts bleeding. If not burned with a cauterium or a caustic after its removal, it relapses"*, but he also compared the malignancy of thymi growing in different parts of the body: *"Thymi on the glans are worse than thymi on the prepuce, and thymi developed deeply on the anus are the worst. The latter, sometimes are expanded from the anus to the pudendum, where they can also grow"* [6].

The second description of thymi in *Hebdomocontabiblos* [7,8] is very similar to Paul's description included in the chapter "Of thymi on the penis" of the *Epitome's* sixth book (Figure 2): *"Thymi are fleshy excrescences forming sometimes upon the glans and sometimes upon the prepuce; and some of them are malignant, and some are not. Those which are of a mild nature it will be proper to pare away with the edge of a scalpel and sprinkle the part*

with chalcitis; but when malignant, the part must be burned after they are removed. If there are thymi on both sides of the prepuce, some internal and others external, we must not attempt all at the same time, lest by mistake we should cut off the prepuce, which is thin; but we must first cut off the internal and when they are healed, we may next attempt the external. Some of the moderns effect a cure by cutting them off with a pair of scissors and by binding them with a horse-hair; as, in like manner, some burn them with the cold cauterium" [9].

In the 45th chapter of the sixth book, Paul considered the features of malignancy, characterizing cancer as *"...uneven, swelling, rough, unseemly, darkish, painful and sometimes without ulceration (which Hippocrates called also concealed cancer) and if operated upon, it becomes worse, and sometimes with ulceration, for it derives its origin from black bile, and spreads by erosion, forming in most parts of the body..."* [10].

Ten chapters earlier he devoted a whole chapter for scrofulous glands, defining scrofula (also known as choera) as *"...an indurated gland, mostly forming in the neck, armpits and groins..."*. He continued: *"...those which are painful to the touch, and on the application of medicine, are of a malignant nature, are to be considered as carcinomatous and it is obvious that they do not readily yield to a surgical operation..."* [11].

Discussion

Both Oribasius of Pergamus and Paul of Aegina used the word "thyme" (pl. thymi) to describe penile tumours. The word *thyme* (or *thymion*) is derived from the Greek noun *θύμος*, a product of the verb *θύω* which means 'to spring up'. The word is used to describe a genus of aromatic perennial herbaceous plants growing flat in the ground (like penile tumours) [12]. Celsus used the word *thymion* (pl. *thymions*) to depict thymi on genitals, centuries before Oribasius and Paul. He described the lesion as *"an elevated tumour above the surface of the body like a small wart, narrow at the skin, broader above, and somewhat hard, with a very rough surface, of the colour of the herb thyme; and being easily divided, it discharges a cruentate matter, and sometimes pure blood"* [13]. He marked that thymions appear *"on the palms or lower parts of the feet, though the worst occur about the genitals, and have more disposition to bleed there"* [13].

Celsus considered that simple excision is more than enough for their radical removal and he quoted that they can also be removed by applying on them *"a fig boiled in water"* [13]. Oribasius

DES THYMES.

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Mai 186-187.

τῆς βαλάνου, ποτὲ δὲ ἐπὶ τῆς πόσθης, Θύμοι καλούμενοι· εἶδη δὲ
 2 διττὰ τῶν Θύμων· οἱ μὲν γὰρ αὐτῶν εἰσι κακοήθεις, οἱ δὲ οὐ. Τοὺς
 μὲν οὖν μὴ κακοήθεις ἀποξύνειν σμίλης ἀκμῇ προσήκει, Φαρμάκῳ τε
 χρῆσθαι μετὰ τοῦτο τῶν ἡρέμα ἐσχαρούντων· ἐπὶ δὲ τῶν κακοήθων
 187 3 μετὰ τὴν ἀφαίρεσιν | καύσει χρῆσιόν. Ἐπεὶ δὲ πολλάκις ἐπὶ τῆς 5
 πόσθης γίνονται Θύμοι κατὰ τὰ ἐνδον αὐτῆς καὶ κατὰ τὰ ἔξω μέρος,
 καὶ τινες αὐτῶν καὶ κατὰ τὸ αὐτὸ μέρος, ὥστε εἶναι κατὰ ἀλλήλων,
 χρῆ μὴ πᾶσιν αὐτοῖς ἀθρόως ἐπιχειρεῖν· εἰ γὰρ τις καύσειε κάκ
 τῶν ἐνδοθεν κάκ τῶν ἔκτοσθεν μερῶν τὴν πόσθην, καὶ μάλιστα ἐπὶ
 4 ἀλλήλαις ποιοῦμενος τὰς καύσεις, λήσεται διατρήσας αὐτήν. Ἄμει- 10
 νον οὖν κατὰ μέρος πρῶτον τὸ ἐνδοθεν ἀποτεμόντας καὶ διακαύσαν-
 τας καὶ ἀπουλώσαντας κατὰ τρόπον, οὕτως ἐξ ὑστέρου καὶ ἐπὶ τὴν
 τῶν ἄλλων Θεραπείαν παραγίνεσθαι.

charnues et rouges, qu'on appelle *thymes*; il y a deux espèces de thymes :
 2 les uns, de mauvaise nature; les autres, indifférents. Il faut donc
 aviver, avec le tranchant d'un scalpel, les thymes bénins et employer
 après cela quelque médicament légèrement escarotique; pour les thymes
 malins, il faut, au contraire, recourir à la cautérisation après les avoir
 3 enlevés. Mais, comme des thymes se forment souvent [simultanément]
 à la partie intérieure et à la partie extérieure du prépuce, et comme
 souvent aussi quelques-unes de ces tumeurs ont leur siège sur le même
 point, de façon à se correspondre, il ne faut pas opérer toutes ces tu-
 meurs d'un seul coup : en effet, si on cautérisait le prépuce à la fois à
 la partie intérieure et à la partie extérieure, et surtout si on faisait ces
 cautérisations sur des points diamétralement opposés, on percerait le
 4 prépuce sans s'en douter. Il est donc préférable de faire d'abord une
 ablation partielle à la face intérieure, de cautériser et de cicatrizer comme
 il faut, et de passer ensuite au traitement des autres thymes.

3. οὐν εὐήθεις Paul. — 7. αὐτῶν ex ἐμπροσθεν R. — 10. ἀλλήλοισ R. — Ib.
 em.; αὐτό R. — 9. ἔκτοσθεν ex em.; ποιοῦμενοι R.

Figure 1. Management of thymi (i.e. penile tumours) according to Oribasius (Bussemaker UC, Daremberg C, Molinier AELM: *Περὶ θύμων τῶν ἐν αἰδοίοις*. In: *Oeuvres d'Oribase: texte Grec, en grande partie inédit, collationnée sur les manuscrits*. Volume 4. Paris: Impr. nationale; 1862: 471).

and Paul discriminated penile thymi in malignant and benign. The term “malignant thymi” obviously referred to the penile cancer. They both recommended the surgical excision of these lesions and emphasized the value of supplementary thermal (cauterization) or chemical burning (application of caustics). Otherwise, relapse seemed more than possible. The management of such lesions was a reality of every day surgical practice, as Francis Adams (Paul’s translator) commented that malignant penile tumours were quite frequent: “...
 these intractable tumors on the genital member are now frequently met with...” (Figure 2) [10]. Paul was aware of the possibility of lymph node affection in patients with such tumours. He considered the painful lymph nodes cancerous for which surgery had little to offer.

For the benign thymi (i.e. condylomata), Oribasius noted that if they do not slough automatically, they can be removed with a scalpel. Paul recommended the usage of chalcitis after their surgical removal. According to Pliny’s and Di-

SECT. LVIII.—OF THYMI ON THE PENIS.

Thymi are fleshy excrescences, forming sometimes upon the glans, and sometimes upon the prepuce; and some of them are malignant, and some are not. Those which are of a mild nature it will be proper to pare away with the edge of a scalpel, and sprinkle the part with chalcitis; but when malignant, the part must be burned after they are removed. If there be thymi on both sides of the prepuce, some internal and others external, we must not attempt all at the same time, lest by mistake we should cut off the prepuce, which is thin; but we must first cut off the internal, and, when they are healed, we may next attempt the external. Some of the moderns effect a cure by cutting them off with a pair of scissors, and by binding them with a horse-hair; as, in like manner, some burn them with the cold cautery.

COMM. COMMENTARY. Albucasis copies our author's description. (Chirurg. ii, 56.) When the tumour is of a malignant nature, he particularly approves of using the actual cautery. These intractable tumours on the genital member are now frequently met with.

Figure 2. Management of thymi (i.e. penile tumours) according to Paul (*Adams F: Of thymi on the penis. In: The seven books of Paulus Aegineta. Volume 6. London: Sydenham Society; 1846: 350-351*).

oscorides' descriptions [14], chalcitis was a preparation of copper, resembling what is now called the copper sulphate (blue vitriol), which was used in wounds and trenches because of its coagulating properties.

Both Oribasius and Paul gave extended details for the different management of co-existing internal and external tumours of the prepuce. In such cases, they discouraged the simultaneous treatment of tumours on both sides because the prepuce is thin and will be perforated if cauterized internally and externally. In addition, Paul mentioned the usage of "cold cautery" (*psychrokauterion in Greek*) for the removal of thymi. This seems to have been a form of cryopexy, also used for treating clavi, myrmecia and acrochordones [15].

However, the method, by which it was cooled, remains a mystery [16].

Conclusions

Byzantine physicians provided detailed descriptions of conservative and surgical treatment of both benign and malignant penile tumours, which demonstrated the high level of surgical knowledge that was achieved those days. Interestingly, penile-preserving treatment, which has recently become the therapeutic strategy of choice for most penile cancer patients, was already accomplished during the Byzantine period by using adjuvant thermal or chemical burning after local tumour excision.

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