

## Clinico pathological characteristics and surgical treatment of carcinoma of the penis: a single surgeon experience

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**Keywords:** Penile cancer; squamous cell carcinoma of the penis; phimosis; circumcision

### Abstract

#### Introduction

Carcinoma of the penis is a disease of older men with an increased incidence in 6th decade of life. It is a rare malignancy in men with an annual incidence of one in 100,000 worldwide. Squamous cell carcinoma accounts for more than 95% of the penile malignancies. It has a significant geographical variation worldwide with a high prevalence in African and Asian countries. Usually these patients present late resulting in devastating complications and treatment challenges.

#### Methods and materials

A retrospective analysis of data collected from 2009 to 2018 in four different provinces in Sri Lanka by the same author. Data were collected prospectively using a pro forma data sheet by the author. This study analyzed the clinico-pathological characteristics of consecutive patients with histopathologically proven penile cancer. Human papilloma virus (HPV) types, HPV-16 and HPV-18 were not assessed.

#### Results

Twenty eight patients with penile carcinoma were analyzed. The age ranged from 26 years to 86 with a mean age of 61.30. The commonest presentation was a non-healing ulcer on the glans (13/28). None of the patients had undergone circumcision and 10 patients had phimosis at presentation. Majority 67.85% of the patients presented within three months of recognizing the problem. Majority had involvement of the glans penis (24/28= 85.71%) at presentation. Palpable inguinal lymph nodes were found in 10 patients and eight of them had bilateral palpable inguinal lymphadenopathy. Surgical treatment varied from circumcision to total penectomy. Twenty four patients had conventional squamous cell carcinoma (SCC) while one patient had SCC in situ accounting for more than 85.71% of

the tumour type to be squamous cell malignancy. Other types of malignancy detected were sarcomatoid SCC, Verrucous SCC and Basal cell carcinoma.

#### Conclusions

This study revealed that all patients were uncircumcised and 35.71% (10/28) of the subjects had phimosis at presentation which is considered as a risk factor for developing penile carcinoma. 35.71% of the patients were within the age group of 60 to 69 similar to international figures for age at peak incidence of the penile carcinoma. Commonest penile structures involved at presentation were foreskin and glans in keeping with international data. This observational study of penile carcinoma very clearly demonstrates and represents the similarity with the global pattern of this rare disease.

#### Introduction

Carcinoma of the penis is a rare malignancy in men. An incidence of 0.4% of all malignancies has been observed in United States and Western Europe whereas around 10% incidence has been seen in Asia, parts of Africa and South America. Men older than 50 years has the highest incidence [1] and is uncommon in younger men. Approximately 95% of these tumours are squamous cell carcinomas [SCC], which usually arise from the epithelium of the inner prepuce or the glans. Two thirds of the SCC are common [conventional] SCC. The other subtypes of SCC are warty carcinoma [7-10%], papillary carcinoma [5-15%], basaloid carcinoma [4-10%] and verrucous carcinoma [3-8%]. Sarcomatoid SCC accounts for 1-3% and has a very poor prognosis [2].

Known risk factors for carcinoma of the penis are lichen sclerosis [balanitis xerotica obliterans, BXO], phimosis, cigarette smoking and chronic inflammation [3]. Human papilloma virus [HPV] infection is also a known predisposing factor for carcinoma of the penis and it accounts for 30% to 40% of the cases. HPV 16 and HPV 18 are the most common types of HPV involved in penile carcinoma [4]. There are two distinct pathways suggested for carcinogenesis of penile carcinoma namely; viral associated with HPV and none viral associated with other conditions as described above.

The objective of this study was to present a single surgeon experience of a consecutive series of penile cancer patients

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**Table 1.** Cases detected in different provinces during the study period

Year	N=28	Province
2009	3	North Western (Teaching Hospital Kurunegala)
2010	1	
2011	1	North Central (Teaching Hospital Anuradhapura)
2012	3	
2013	5	North Western (Teaching Hospital Kurunegala)
2014	2	
2015	1	
2016	4	
2017	1	
2018(till March)	2	
2018(March – June)	4	Sabaragamuwa (Teaching Hospital Rathnapura)
2018(July - Dec)	1	Western (The National Hospital of Sri Lanka)

treated over a 10-year period detailing the clinicopathological characteristics.

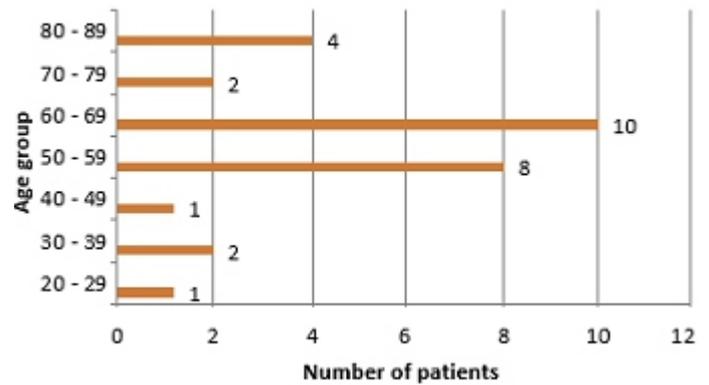
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**Methods**

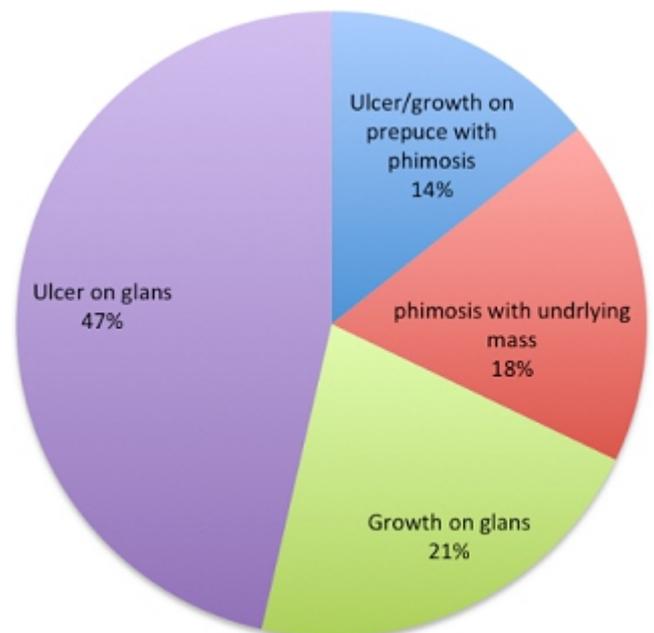
This is a retrospective analysis of cancer data collected prospectively from patients with histopathologically confirmed penile cancer treated by a single urological surgeon. The data was collected during a 10-year period from Jan 2009-Dec 2018. The study analysed the demographic data, clinical presentation, histopathological details and the initial surgical treatment of the primary tumour and regional lymph nodes. Tumour specimens were not tested for HPV DNA.

**Results**

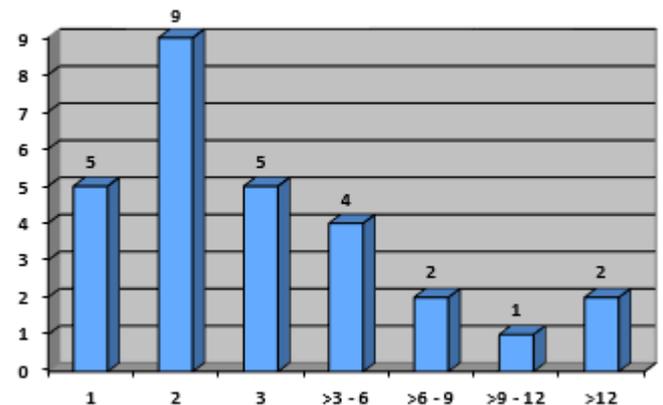
Twenty-eight patients with penile cancer were seen during the 10-year period with a mean age of 61.3 years [range 26-86]. Twenty four patients [85.7%] were above 50 years of age [Fig 1]. The youngest patient was 26 years old at initial presentation with phimosis and an underlying mass, and had an aggressive course of the disease succumbing to it within 6 months. The patients were predominantly from 3 provinces of Sri Lanka, North Western [Kurunegala], North central [Anuradhapura] and Sabaragamuwa [Rathnapura] provinces where the author was the single urological surgeon serving 3 different tertiary referral hospitals. The final 6 month patient recruitment was from the western province, at the tertiary institution National Hospital of Sri Lanka [NHSL] served by 3 urological surgeons. The patients diagnosed from each province and the time periods are detailed in Table 1.



**Figure 1.** Age distribution



**Figure 2.** Clinical presentation



**Figure 3.** Duration of symptoms in months

All men were uncircumcised. Twenty-seven [96.4%] of them were Sinhalese with one Tamil patient. Muslims [circumcised men] were absent in this series. The commonest presentation was a non-healing ulcer on the glans penis [13/28] [Fig 2].

Ten patients [35.7%] had phimosis at initial presentation. The duration of symptoms shows that the vast majority [67.9%] had presented within 3 months of noticing the penile lesion [Fig 3].

**Table 2.** Histopathological grading of common SCC (n=25)

Grade [G]	No
G1 Well differentiated	12
G2 Moderately differentiated	12
G3 Poorly differentiated	1
G4 Undifferentiated	0

**Table 3.** Primary site of penile cancer

Foreskin alone	4
Glans alone	13
Foreskin and glans together	11

**Table 4.** Local spread within penis

External meatus:	4
Cavernosal tissue:	5
Spongiosal tissue:	5
Urethra :	2

**Table 5.** Type of surgical intervention

Type of surgical intervention	Number of patients
Circumcision alone	4
Circumcision + wide local excision (Partial Glansectomy)	8
Partial penectomy	12
Total penectomy	4

The commonest histopathological type was squamous cell carcinoma [SCC] accounting for 25/28(89.2%) of all men with penile cancer. Verrucous SCC and sarcomatoid SCC had one patient each and the remainder was a basal cell carcinoma. Of the common SCC patients [n= 25], majority of patients had well or moderately differentiated tumour grades table 2.

Analysis of the extent of the penile involvement at presentation showed 24/28 [85.7%] having glans penis involvement [thirteen exclusively glans penis] and 15/28 [53.6%] preputial [foreskin] involvement [4 foreskin alone]. Tables 3, 4 and 5 show the extent of penile involvement of the primary tumour and the surgical procedure offered to correct it.

Table 6 shows the clinical stage of primary tumour and lymph nodes in common SCC and verrucous SCC patients.

Partial penectomy, the most commonly performed procedure, was the surgical intervention for the primary tumour in 12

[42.8%] patients. The vast majority of the patients, 16/28 [57.1%] had no palpable inguinal lymph nodes [N0 disease] and were kept under long-term surveillance.

**Table 6.** 2016-TNM clinical classification of 26 SCC patients (sarcomatoid carcinoma excluded)

CLINICAL T STAGE (corresponds to pathological T categories)	No
Tis carcinoma in situ	1
Ta Non-invasive verrucous carcinoma	1
T1 Tumour invades subepithelial connective tissue	14
T1a without lymphovascular invasion and is not poorly Differentiated	4
T1b with lymphovascular invasion or is poorly Differentiated	10
T2 Tumour invades corpus spongiosum with or without invasion of the urethra	5
T3 Tumour invades corpus cavernosum with or without invasion of the urethra	5

**Table 7.** Surgical intervention for inguinal lymphadenopathy

Side of inguinal block dissection	Number of patients
Right sided block dissection	3
Left sided block dissection	4
Bilateral block dissection	3
No block dissection	2
Total	12

Palpable inguinal nodes were found in 12 patients and seven of them had unilateral palpable inguinal lymphadenopathy. Out of the five patients with bilateral lymphadenopathy, one patient had bilateral extensive lymph node enlargement not amenable for surgery and in another patient, lymph node FNAC revealed inflammatory cells only and kept under surveillance. Table 7 depicts the surgical procedures undertaken to treat the regional lymphatics.

## Discussion

There were 3 notable publications on penile cancer from Ceylon [presently Sri Lanka] in the first half of the 20th century [5,7]. Surprisingly, there is a paucity of literature on the subject since then. Chalmers reported on the incidence of cancer in Ceylon for the year 1903 where there were 122 male patients of a total of 222. Cancer of the penis accounted for 32/122 [26.2%] of male patients [5]. Spittel sharing his experience expressed that carcinoma of the penis is an astonishingly common malignant disease in Ceylon. In a 4-year period [June 1911- June 1915], no fewer than 91 cases were operated by him at the General Hospital Colombo [now

NHSL], where he was one of three general surgeons [6]. He further stated that carcinoma of the penis is never seen in Moors who practice circumcision; it is most common in Singhalese cultivators. This fact is amply demonstrated in this study. Paul reported that in the year 1928, of 415 cases admitted with cancer to the General Hospital Colombo, 55 [13.3%] were penile cancer [7].

Today, carcinoma of the penis is a rare disease in Sri Lanka with only 90 new cases recorded during the year 2014 by the National Cancer Control Programme of Sri Lanka [8]. In this country, this condition is currently treated primarily by general surgeons, urological surgeons and oncological surgeons and this demonstrates the low number seen by an individual surgeon annually. The significant decline in the incidence of penile cancer in Sri Lanka in the past century is not yet explained. In the past 10 years the author had treated 28 patients with approximately 85% of them being over 50 years. All men in the present series were uncircumcised. This would explain the absence of a single Muslim patient in this series.

Daling et al in their population-based study in the USA identified an incidence of 35% phimosis in those with cancer of the penis who had not been circumcised in childhood. In the controls with no cancer, the incidence of phimosis was significantly lower at 7.6% (OR=7.4, 95% CI 3.7 to 15.0)

Hernandez et al reported a large series of almost 5000 cases of invasive penile carcinoma among men in the United States. Primary site of the disease was glans penis in 34.5%, prepuce in 13.2%, shaft of the penis in 5.3%, overlapping in 4.5% and unspecified in 42.5% among men in the United States [9]. In the current study the primary site of penile cancer were: glans penis [46.4%], prepuce and glans penis together [39.3%] and prepuce [14.3%].

In a study by Guimaraes and colleagues on 333 cases in Brazil found that 65% of the patients had common SCC, 5% papillary SCC, 4% basaloid SCC, 7% warty SCC, 7% verrucous SCC, 1% sarcomatoid SCC, 1% adenosquamous and 10% mixed. The worst prognosis has been reported in basaloid and sarcomatoid variants [10].

Verrucous SCC is usually felt to be of low malignant potential metastasizing rarely. In the present series common SCC was the most common accounting for 89.2% of patients with 1 patient each [3.6%] of the verrucous and the sarcomatoid variants of SCC. Basal cell carcinoma [BCC] of the penis, affecting one patient [3.6%] in this study, is reported as an extremely rare penile cancer in the world literature.

Penile BCC is a slow growing lesion unlikely to spread beyond local disease. Occurrence of recurrence has been rare even with wide local excision of the lesions. In 6688 cases of male BCC referred for Mohs micrographic surgery over a 25-year period, only 2 cases [0.03%] of penile BCC were found by Nguyen and colleagues [11].

As mentioned in Young's Practice of Urology published in 1926, penile cancer is primarily managed surgically, since the end of 19th century [12]. En-block removal of the penis, partial or total, with bilateral inguinal lymph nodes was espoused by the pioneer surgeons. This procedure is carried out even now in the 21st century. Lesions which are confined to the prepuce may be managed with circumcision alone as described by Young in his text in 1926.

Partial penectomy accounted for 12/28 [42.8%] of surgical procedures in the present series. Four patients with cancer confined to the prepuce in the present series underwent only a circumcision as the surgical procedure. No groin dissection was done in these 4 patients.

Circumcision is an option in the management of carcinoma of the penis. Any lesion confined only to the prepuce is considered as an indication for circumcision. Even in superficial glanular lesions [Tis], circumcision can remove the microenvironment favourable for HPV which could prevent chronic inflammation and invasive disease. Circumcision will allow proper physical examination of the glans penis in long-term follow-up [13].

The most common surgical procedure for the treatment of primary tumour in patients with invasive SSC of the penis is partial penectomy. The main reason for this procedure is to allow the patient to void in a standing position and to have adequate sexual function while maintaining proper local control of the disease.

Total penectomy is the treatment of choice if partial penectomy does not allow excision of the lesion with negative margins and or adequate penile stump. Four patients [14.3%] in this series had to undergo total penectomy. The surgical treatment for the primary tumour were circumcision in 4 patients, local excision in 2, partial penectomy in 194 and total penectomy in 133 in the Brazilian study [10].

The most important prognostic factor with regard to the survival of patients with penile carcinoma is the presence of nodal involvement by the tumour. Small occult metastases cannot be detected by physical examination alone and dynamic sentinel node biopsy [DSNB] using 99mTc nano colloid technique was not available in author's practice.

## Conclusion

Carcinoma of the penis as a rare malignancy in men with an annual incidence of one in 100,000 worldwide. In this cohort of patients it was revealed that all of them were uncircumcised and around 35% of them had phimosis at presentation which is a well known risk factor for carcinoma of the penis. Age of peak incidence and common penile structures involved by the disease in this series of patients are similar to that of international data.

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