Increasing trend of penile cancer cases in Bali compared to other regions in Indonesia

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Abstract. Penile cancer is a rare type of cancer in developed countries and found high in the developing country. This study aims to compare penile cancer cases in Bali and other regions in Indonesia. A 10 years review cases from cancer registry of Pathologic Anatomy Indonesia were done from 2004 to 2013. Penile cancer cases were found highest in Bali compared to other regions in Indonesia. This cancer showed an increase in number from the year of 2004 and reached its peak in 2013. Penile cancer is the most common cancer found in Balinese male population from the latest cancer registry in 2013. Risk factors associated with penile cancer are phimosis, lichen sclerosis, HPV infection, and history of wart or condyloma, lack of circumcision, multiple sex partners, and early sexual activity. Lack of circumcision is an important risk factor found in Bali. Penile cancer shows an improvement during the last 10 years and provides a new insight on the cancer issues in Bali. A preventive efforts such as improving hygiene factors on male reproductive organs, do circumcision, save sex practice and new recommendations for a routine male HPV vaccination may further reduce penile cancer cases.

1. Introduction
Primary penile cancer is a relatively rare neoplasm, the incident rates of penile cancer are vary among different populations. The high incident rates were found in Central and South America with age-standardized incidence rates ranging from 1.5-1/100,000. Meanwhile, the low incidence rates were found in United States and Australia ranging from 0.3-1 / 100,000 [1,2] Risk factors associated with penile cancer are phimosis, chronic inflammation especially lichen sclerosus, HPV infection, smoking, ultraviolet irradiation, history of warts or condyloma, lack of circumcision, multiple sex partners, early and high sexual activity [3,4,5,6]. Male circumcision may decrease risk of HPV infection and penile cancer [7]. Moreover, the risk of penile cancer increases with age. The average age of men when diagnosed with penile cancer is about 55 to 60 years old, occasionally seen in young adults and rare in children [2,8].

Indonesia is a country with a Muslim population majority, where circumcision should be routinely done. Penile cancer is a relatively rare neoplasm and does not belong to the 10 most common cancer in Indonesia. However, this diseases commonly found in Bali. Penile cancer cases showed a different distribution in other regions according to the cancer registry. Bali is a famous island, where Hindu is the majority population. Despite of the low burden of penile cancer incident in the world and generally in Indonesia, it is important to assess the recent distribution of this malignancy between regions in Indonesia. Here we compare of penile cancer cases over 10 years in Bali and other regions in Indonesia.
2. Material and methods
This review was conducted from cancer registry of Pathologic Anatomy Specialist Indonesia from 2004 to 2013. Penile cancer is calculated based on different regions in Indonesia.

3. Results and discussion
There were 1,032 cases of penile cancer which diagnosed in 10 years in Indonesia from 2004 to 2013. The highest cases of penile cancer were found in Bali: 40% (543 cases), followed by Jakarta 19% (112 cases), and Yogyakarta 15% (108 cases). The lowest cases were found in Bandung (Fig 1).

The chart (Fig 2) shows increase of penile cancer cases in Bali from the year of 2004 to 2013. Penile cancer cases increased from 2004 then reached its peak in 2006. Later, the cases dropped sharply until 2009 and rose again to the highest peak in 2013. Penile cancer was the most common cancer among the primary tumor malignancy in Bali’s male population (Table.1). In contrast to Indonesian national data, penile cancer did not belong to the top 10 cancer in male population (Table 2).

Figure 1. Distribution of penile cancer in Indonesia.

Figure 2. Number of penile cancer cases in Bali from 2004 to 2013.
Table 1. Most common cancer in Bali male population (2013).

| NO | ORGAN    | CASES |
|----|----------|-------|
| 1  | Penile   | 69    |
| 2  | Prostate | 67    |
| 3  | Nasopharynx | 61  |
| 4  | Skin     | 51    |
| 5  | Rectum   | 36    |
| 6  | Thyroid  | 35    |
| 7  | Colon    | 30    |
| 8  | Lymph Node | 30 |
| 9  | Vesica urinary | 20 |
| 10 | Bone     | 16    |
| 11 | Soft tissue | 16 |

Nasopharynx cancer was the most common male cancer found in Indonesia, followed by other cancers such as Skin cancer, Prostate cancer and others (Table 2).

This study shows that the highest male cancer found in Bali was penile cancer. This finding contrasted with other regions in Indonesia such as Padang, Palembang, Bandung, and Malang. The possible explanation for this situation is because most of the Balinese religion are Hindus, where circumcision is not routinely done like in other regions where Muslim is the majority population. This result was supported by a research conducted in Sanglah Hospital Denpasar by Kusmawan, who found that all of the penile cancer patients (46 cases) had no history of circumcision.[6]

Tabel 2. The most often male cancer according to primary tumor from entire pathologic centre registry in Indonesia in 2013.

| NO | ORGAN    | CASES |
|----|----------|-------|
| 1  | Nasopharynx | 1039 |
| 2  | Skin     | 834   |
| 3  | Prostate | 828   |
| 4  | Rectum   | 799   |
| 5  | Lymph Node | 721 |
| 6  | Vesica urinary | 591 |
| 7  | Colon    | 569   |
| 8  | Soft tissue | 471 |
| 9  | Vesica urinary | 352 |
| 10 | Thyroid  | 303   |

An increasing trend of penile cancer cases between 2004 and 2013 must be anticipated to find risk factors that were associated with this cancer. Various risk factors are proposed to play a role in penile cancer. These generally relate to chronic inflammatory processes such as phimosis, lichen sclerosus, HPV infection, and history of warts or condyloma, lack of circumcision, multiple sex partners, early and high sexual activity [3-6,9,10].

Men who were circumcised in childhood have a lower chance of getting penile cancer than those who were not. However, the same protective effect is not seen in men who had circumcision in adulthood. Some studies even suggested a higher risk of penile cancer in men who were circumcised in their adulthood. The reason for the lower risk in circumcised men is not entirely clear, but it may be related to other known risk factors. For example, men who were circumcised will not develop a condition called phimosis and do not accumulate material known as smegma. Men with smegma or phimosis have an increased risk of penile cancer [11].

Penile cancer strongly associated with many risk factors, and the best way to reduce penile cancer is to prevent the risk factor. The risks of penile cancer in Bali are lack of circumcision, phimosis, and history of urinary tract infection [6]. Smegma accumulation under the phimotic skin results in chronic...
inflammatory that may induce cancer [12]. Men who were circumcised may have a lower chance of becoming infected with HPV, still up to this point, there is no study about this in Bali.

The most penile cancer patients come with exophytic mass (47% cases), ulcerative mass (35%) and an erythematous lesion in 17% [13]. Squamous carcinoma is the commonest type of penile cancer and the tumor may spread horizontally or vertically [4,14]. The glans penile is the most common origin site of the penile cancer, followed by coronal sulcus and foreskin [15]. Lymph node metastasis is predominantly dissemination of penile cancer [16]. This dissemination is fairly predictable, initially to superficial inguinal lymph nodes, then to the deep groin and pelvic nodes, and lastly to retroperitoneal nodes. Distant metastasis commonly found in liver, heart, lung, and bone [17].

Most of the penile cancer patient in Bali have a low social-economic background and is likely related to poor hygiene [6]. Perhaps, the most important factor in preventing penile cancer in uncircumcised men is increasing genital hygiene. Sexual activity related to the number of sex partners does not significantly associate with the penile cancer in Bali, although 30% of the patients have more than 1 wives [6]. Limiting the number of sex partners, avoiding sex with people who have had many other sex partners, and safer sex practice such as condom use, may help lowering the risk factors.

4. Conclusion
The study shows that penile cancer was found highest in Bali compared to other regions in Indonesia. The increasing trend of penile cancer cases in the past 10 years from 2004 until 2013, need to get attention. A preventive effort, such as improve urogenital hygiene, circumcision, safer sex practice, and new recommendations of a routine male HPV vaccination, needs to be socialized to decrease penile cancer cases

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