European Journal of Cancer (2013) 49, 3872–3880

Available at www.sciencedirect.com

ScienceDirect

journal homepage: www.ejcancer.com

Trends in incidence and survival of Dutch women with vulvar squamous cell carcinoma

M.S. Schuurman [a,*,1], L.C.G. van den Einden [b,1], L.F.A.G. Massuger [b], L.A. Kiemeney [a,c,d], M.A. van der Aa [a], J.A. de Hullu [b]

[a] Department of Research, Comprehensive Cancer Centre the Netherlands (IKNL), Utrecht, The Netherlands
[b] Department of Obstetrics and Gynaecology, Radboud University Medical Centre, Nijmegen, The Netherlands
[c] Department for Health Evidence, Radboud University Medical Centre, Nijmegen, The Netherlands
[d] Department of Urology, Radboud University Medical Centre, Nijmegen, The Netherlands

Available online 3 September 2013

KEYWORDS
Vulvar carcinoma
Incidence
Survival
Trends
The Netherlands

Abstract ***Aim:*** Previous studies showed an increase in incidence of vulvar intraepithelial neoplasia (VIN), the premalignant lesion of Vulvar Squamous Cell Carcinoma (VSCC). Furthermore, during the last decades treatment of VSCC became less radical. Considering these changes the aim of this study was to describe trends of incidence and survival of patients with VSCC in the Netherlands.

Methods: All patients with VSCC diagnosed between 1989 and 2010 ($n = 4614$) were selected from the Netherlands Cancer Registry. Trends in age-adjusted incidence rates were evaluated by calculating the estimated annual percentage change (EAPC). Joinpoint regression analysis was used to detect changes in trends. Five-year relative survival rates were calculated for four time periods.

Results: The incidence of VSCC has increased since 2002 (EAPC 5.0; 95% confidence interval (CI): 2.7–7.7%). In women aged <60 years incidence rates increased significantly during the whole study period (EAPC 3.5%; 95% CI: 2.0–4.9), while in women aged ⩾60 years only an increase has observed from 2004 onwards (EAPC 5.0; 95% CI: 1.5–8.6). Survival rates did not change over time.

Conclusion: The incidence rate of VSCC has increased from 2002 onwards in all women. Over the whole study period the increase was strongest in women aged <60 years. The introduction of less radical surgery did not affect survival.

* *Corresponding author:* Address: Comprehensive Cancer Centre the Netherlands (IKNL), P.O. Box 19079, 3501 DB Utrecht, The Netherlands. Tel.: +31 88 2345500; fax: +31 88 2345599.
E-mail address: m.schuurman@iknl.nl (M.S. Schuurman).
[1] These authors equally contributed.

0959-8049/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.ejca.2013.08.003

1. Introduction

Vulvar carcinoma is a rare malignancy. In the Netherlands it is accounting for six to eight percent of all gynaecological malignancies. Annually, approximately 360 new cases of vulvar carcinoma and over 100 deaths are reported [1]. A two to fourfold increasing incidence of the premalignant lesion of vulvar carcinoma, vulvar intraepithelial neoplasia (VIN), is observed in several countries [2–6]. Until now, only few studies showed a tendency towards an increasing incidence in vulvar carcinoma [3,4].

About 80 percent of all vulvar malignancies are squamous cell carcinomas (SCCs) of which 20 percent is related to the human papilloma virus (HPV) and associated with the precursor lesion usual VIN (uVIN). This type of vulvar carcinoma primarily affects younger women. The majority of SCCs is non-HPV related and occurs in elderly women, often in the background of lichen sclerosus (LS) and/or differentiated VIN (dVIN) [7–9].

The last two decades, treatment of patients with vulvar SCC (VSCC) has changed [10]. Until 20 years ago radical vulvectomy with 'en bloc' bilateral inguinofemoral lymphadenectomy was the standard treatment for almost all patients with VSCC. Since the early nineties the surgical treatment of VSCC has become more individualised [11]. Current treatment entails a wide local excision (WLE) with uni- or bilateral inguinofemoral lymphadenectomy via separate incisions. More recently, sentinel lymph node dissection (SLND) has been introduced in early stage VSCC as a safe technique with a very low false negative rate. Though it is the standard management of early stage VSCC, all SLND procedures in the Netherlands are performed within the setting of a clinical trial from 2000 onwards [12]. Compared to a complete lymphadenectomy, SLND is associated with less treatment-related morbidity without compromising prognosis [13]. As the technical skills to perform surgery are not part of the training of general gynaecologists in the Netherlands and the incidence of VSCC is low, treatment in a specialised oncology centre has been advocated by national guidelines of the Dutch Society of Obstetrics and Gynaecology in 2000 [14].

With the intention to study the effect of the increase of patients diagnosed with VIN and the given recent changes in treatment modalities, the aim of this population-based study was to determine the incidence and survival of VSCC in the Netherlands in the period between 1989 and 2010.

2. Patients and methods

2.1. Data collection

Patients diagnosed with a primary vulvar malignancy in the period 1989–2010 in the Netherlands were selected from the Netherlands Cancer Registry (NCR). This nationwide registry documents all newly diagnosed patients with cancer and has a nationwide coverage since 1989. The completeness of the NCR is estimated to be at least 95% [15].

Standard cancer registry data were retrieved from the NCR. These data were collected by fully trained registrars from pathology reports and patient files. Data concerning patients' age, date of diagnosis and tumour characteristics (topography, histology, invasiveness, stage and treatment) were obtained. Information on vital status and date of death was retrieved from municipality registries and from the database of deceased persons of the Central Bureau for Genealogy and the municipal demography registries (GBA). The follow-up data were completed until the 1st January 2011.

Topography and morphology are coded according to the International Classification of Diseases for Oncology (ICD-O) [16]. Tumour-node-metastasis (TNM) classification [17] is used for tumour staging and converted to the classification of the Fédération Internationale de Gynécologie et d'Obstétrique (FIGO) [18]. To evaluate the centralisation to specialised oncology centres, place of treatment (community hospital or specialised oncology centre) was retrieved. A specialised oncology centre is defined as a centre that treats at least 20 patients with vulvar cancer per year, in this study eight academic centres and two large public hospitals were classified as specialised oncology centre. As the classification system of FIGO stage was changed in 2009, analyses considering FIGO stage were only performed until 2009.

2.2. Statistical analyses

For the analyses concerning incidence and survival, only patients with VSCC were included. The study period was divided into four periods (1989–1994, 1995–1999, 2000–2004 and 2005–2010). Descriptive analyses and Chi-square tests were performed to evaluate differences in patient and tumour characteristics between different time periods. Annual age-standardised incidence rates adjusted to the European standard population (ESR) were calculated. Changes in rates were evaluated by calculating the estimated annual percentage change (EAPC) and the corresponding 95% confidence interval. To calculate this, a regression line was fitted to the natural logarithm of the rates, using the calendar year as regressor variable (i.e. $y = ax + b$ where $y = \ln(\text{rate})$ and $x = \text{calendar year}$, then $\text{EAPC} = 100 * (ea - 1)$). The Joinpoint Regression Programme (version 3.5.1.) from the Surveillance Research Programme of the US National Cancer Institute (http://surveillance.cancer.gov/joinpoint/) was used to identify significant changes in trends.

Relative survival rates (RSR) were calculated as an estimation of cause-specific survival according to the