

# Squamous Cell Carcinoma Due to Repeated Cutaneous Exposure to Paint

Hsien-Feng Lin<sup>1</sup>, Ching-Mei Chang<sup>2,3</sup>, Chiu-Shong Liu<sup>1</sup>

<sup>1</sup>Department of Family Medicine and Occupational Medicine, China Medical University Hospital;

<sup>2</sup>Department of Nursing, Central Taiwan University of Sciences and Technology;

<sup>3</sup>Department of Nursing, Tungs' Taichung MetroHabor Hospital, Taichung, Taiwan.

Paint is commonly used in construction work. Although many types of paint are known to cause skin irritation, there have been no published reports of cancer developing after cutaneous exposure to paint in humans. We present a case of squamous cell carcinoma that developed on the opisthenar eminence of both hands of a professional painter after repeated exposure to paint. ( *Mid Taiwan J Med* 2007;12:235-9 )

## Key words

occupational exposure, paint, skin, squamous cell carcinoma

## INTRODUCTION

Basal cell carcinoma and squamous cell carcinoma constitute the most common types of cancer seen in white populations [1-3]. Much of the incidence of these diseases is known to be due to exposure to solar ultraviolet radiation [4], but little information has been collected in a systemic manner that would permit the examination of other, non-solar risk factors for these common cancers. The first report of occupational non-melanoma skin cancer was made by Percival Pott in 1775 and involved cancer of the scrotum in chimney sweeps [5]. Other classical occupational non-melanoma skin cancers have been described in people working outdoors and people working with welding equipment, asphalt, tar and oil products, inorganic arsenic and ionizing radiation [6-11].

We report a case of squamous cell carcinoma that developed on the opisthenar eminences of both hands of a professional painter after repeated exposure to paint.

Received : 16 March 2007.

Revised : 25 May 2007.

Accepted : 14 September 2007.

Address reprint requests to : Ching-Mei Chang, Department of Nursing, Tungs' Taichung MetroHabor Hospital, 699, Section 1, Chung-Chi Road, Wuchi, Taichung 435, Taiwan.

## CASE REPORT

A 58-year-old man with a history of chronic hepatitis C presented with a several-month history of a slowly enlarging nodule on the dorsal aspect of his left hand. He noted some irritation from the nodule but was otherwise asymptomatic.

The patient has been a painter for the past 30 years. He reported that he always mixed paints by hand without gauntlet gloves and that he cleaned his hands with solvents several times a day, resulting in repeated exposure for about 30 years. He was otherwise healthy with no other medical history. The patient did not use tobacco, alcohol, illicit drugs, or long term medications and had no history of arsenic exposure. There was no personal or family history of cancer.

In March 2005, the patient underwent simple excision of the nodule. Microscopic examination of the lesion showed a picture of moderately differentiated keratinizing squamous cell carcinoma (9 mm × 8 mm in size) with deep dermal invasion (measuring 3 mm in depth); however, no lymphovascular permeation or perineural invasion was seen and the section margin was free (Figs. 1, 2). The patient

underwent a wide margin excision (6 cm × 5 cm) (2 cm deep) extending to the tendons. A frozen pathologic sample of the tumor base showed chronic inflammation at the biopsy site; no residual cancer was present. The base section line and the peripheral section lines were free of tumor cells. The defect was reconstructed with a full-thickness skin graft from the left thigh. At 6-month follow-up, the patient had full, symmetric range of motion of his left hand. There was 100% take of the full-thickness skin graft (Fig. 3). The only side effects were numbness and diminished light-touch sensation on the dorsal aspect of his left hand.

A small nodule, measuring 0.5 cm × 0.5 cm, on the dorsal aspect of his right hand was noted in January 2006. He underwent simple excision of the nodule. Microscopic examination of the lesion showed a well-differentiated keratinizing squamous cell carcinoma (measuring 5 mm in diameter and 3 mm in depth) with invasion to the deep dermis; no lymphovascular permeation or perineural invasion was seen and the section margin (1 mm) was free (Figs. 4, 5). He refused to undergo wide excision and reconstruction because of the previous post-surgical complication of the left hand. He has been followed at the outpatient department since then and no evidence of local recurrence was noted at the most recent follow-up in September 2007.

### DISCUSSION

The incidence of non-melanoma skin cancer has increased during recent decades, and is generally ascribed to increased solar exposure [12-16]. In cases of non-melanoma skin cancer, an occupational etiology must be considered [17-19]. Several findings indicate a higher risk of skin cancer among workers in basic chemical production, the printing industry and among professional, technical, and white-collar workers [20]. Furthermore, associations have been observed for men employed in the brewery and malt-processing industry, and in shoe fabrication involving leather [20]. Often, though not always, the tumor arises in the exposed area [16].

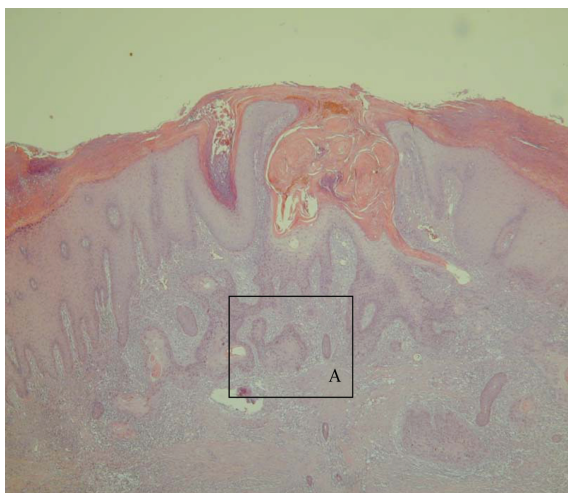


Fig. 1. Low power photomicrograph of left hand lesion.

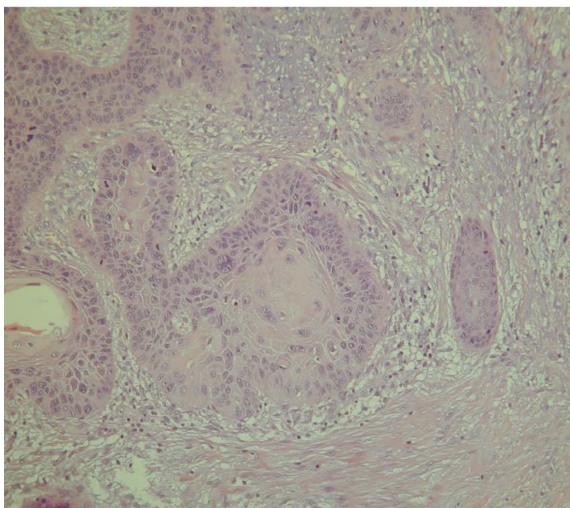


Fig. 2. High power photomicrograph of left hand lesion (from Fig. 1 (A)).



Fig. 3. Postoperative appearance of skin graft (left hand).

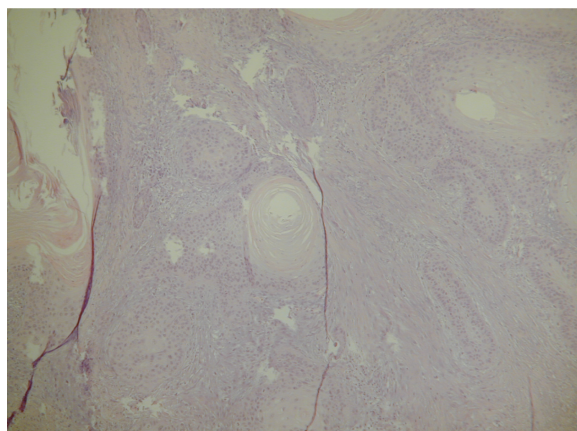


Fig. 4. Low power photomicrograph of right hand lesion.

Paint is primarily composed of a base resin hardener and a thinner, which comprises many kinds of solvents such as ketones, esters, toluene, xylene and aromatic hydrocarbons [21,22]. These solvents have been listed as hazardous compounds by the Taiwan Council of Labor Affairs. Excessive exposure to organic solvents may cause irritation to skin, mucous membranes, and eyes, and some may even cause intoxication and increase cancer risk. Organic solvents may increase the risk of non-Hodgkin's lymphoma and multiple myeloma [23-26]. The long-term consequences of skin exposure to paint in humans are unknown. Although paint is known to cause skin irritation, there have been no published reports describing cancer development after cutaneous exposure to paints in humans.

We hypothesize that the squamous cell carcinoma found in this patient may have occurred as a consequence of cutaneous exposure to paints. Although this theory would be impossible to prove in an ethical fashion, we believe this finding warrants greater vigilance for possible cutaneous manifestations of the long-term effects of paint exposure.

In order to identify potential new occupational hazards, it is crucial, even in the case of low grade cancers such as non-melanoma skin cancer, that they be reported if occupational exposure is suspected as a contributory cause.

Our case illustrates potential toxicities associated with cutaneous exposure to paint.

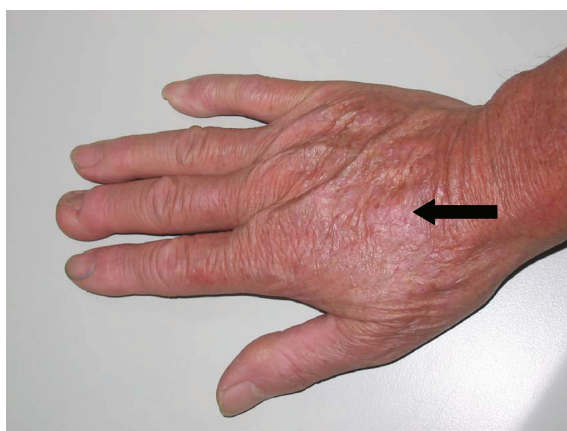


Fig. 5. Appearance of skin lesion (right hand, post biopsy).

Careful monitoring of the skin should be a part of every occupational surveillance program.

## REFERENCES

1. Marks R, Staples M, Giles GG. Trends in non-melanocytic skin cancer treated in Australia: the second national survey. *Int J Cancer* 1993;53:585-90.
2. Gallagher RP, Ma B, McLean DI, et al. Trends in basal cell carcinoma, squamous cell carcinoma, and melanoma of the skin from 1973 through 1987. *J Am Acad Dermatol* 1990;23:413-21.
3. Glass AG, Hoover RN. The emerging epidemic of melanoma and squamous cell skin cancer. *JAMA* 1989;262:2097-100.
4. IARC. IARC Monographs on the Evaluation of Carcinogenic Risk to Humans. Vol. 55, Solar and Ultraviolet Radiation. Lyon, France: IARC, 1992.
5. Potter M. Percival Pott's contribution to cancer research. *Natl Cancer Inst Monogr* 1963;10:1-5.
6. Travis LB, Arndt KA. Occupational skin cancer. Four major cancer carcinogens that put workers at risk. *Postgrad Med* 1986;79:211-7.
7. Beral V, Robinson N. The relationship of malignant melanoma, basal and squamous skin cancers to indoor and outdoor work. *Br J Cancer* 1981;44:886-91.
8. Vitasa BC, Taylor HR, Strickland PT, et al. Association of nonmelanoma skin cancer and actinic keratosis with cumulative solar ultraviolet exposure in Maryland watermen. *Cancer* 1990;65:2811-7.
9. Rhodes AR. Public education and cancer of the skin. What do people need to know about melanoma and nonmelanoma skin cancer? *Cancer* 1995;75(2 Suppl):613-36.

10. Hansen J, Olsen JH. Cancer morbidity among Danish female pharmacy technicians. *Scand J Work Environ Health* 1994;20:22-6.
11. Pukkala E. Cancer incidence among Finnish oil refinery workers, 1971-1994. *J Occup Environ Med* 1998;40:675-9.
12. Suarez-Varela MM, Llopis Gonzalez A, Ferrer Caraco E. Non-melanoma skin cancer: a case-control study on risk factors and protective measures. *J Environ Pathol Toxicol Oncol* 1996;15:255-61.
13. Emmett EA. Occupational skin cancer: a review. [Review] *J Occup Med* 1975;17:44-9.
14. Strom SS, Yamamura Y. Epidemiology of nonmelanoma skin cancer. [Review] *Clin Plast Surg* 1997;24:627-36.
15. Staples M, Marks R, Giles G. Trends in the incidence of non-melanocytic skin cancer (NMSC) treated in Australia 1985-1995: are primary prevention programs starting to have an effect? *Int J Cancer* 1998;78:144-8.
16. Marks R. The epidemiology of non-melanoma skin cancer: who, why and what can we do about it. [Review] *J Dermatol* 1995;11:853-7.
17. Veys CA. ABC of work related disorders. Occupational cancers. [Review] *BMJ* 1996;313:615-9.
18. Grodstein F, Speizer FE, Hunter DJ. A prospective study of incident squamous cell carcinoma of the skin in the nurses' health study. *J Natl Cancer Inst* 1995; 87:1061-6.
19. Wahlberg JE, Johansson G. Skin cancer of the hand and arm in Sweden 1966--70 in relation to previous occupational exposure. *Berufsdermatosen* 1977;25: 185-95.
20. Linet MS, Malaker HS, Chow WH, et al. Occupational risk for cutaneous melanoma among men in Sweden. *J Occup Environ Med* 1995;37:1127-35.
21. Lei U, Masmans TN, Frenzt G. Occupational non-melanoma skin cancer. *Acta Derm Venereol* 2001; 81:415-7.
22. U.S. EPA. Office of Research and Development, Guide to Cleaner Technologies: Organic Coating Removal, EPA/625/R-93/015, 1994:6-32.
23. ATSDR (Agency for Toxic Substances and Disease Registry). Toxicological profile for methylene chloride, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention: USA, 2000:13-63.
24. Blair A, Hartge P, Stewart PA, et al. Mortality and cancer incidence of aircraft maintenance workers exposed to trichloroethylene and other organic solvents and chemicals: extended follow up. *Occup Environ Med* 1998;55:161-71.
25. Dell LD, Mundt KA, McDonald M, et al. Critical review of the epidemiology literature on the potential cancer risks of methylene chloride. [Review] *Int Arch Occup Environ Health* 1999;72:429-42.
26. OSHA (Occupational Safety and Health Administration). Occupational health guideline for methylene chloride. US Department of Labor, 1978:1-5.

# 油漆暴露與雙手皮膚鱗狀上皮細胞癌

林獻鋒<sup>1</sup> 張靖梅<sup>2,3</sup> 劉秋松<sup>1</sup>

中國醫藥大學附設醫院 社區醫學部<sup>1</sup>

中台科技大學 護理系<sup>2</sup>

童綜合醫院 護理部<sup>3</sup>

油漆是建築業常用的化學物質之一。皮膚接觸到油漆會引起皮膚刺激反應已廣為所知，但是人類皮膚因暴露於油漆而產生皮膚癌的情形並未曾被報導過。本文報告一長期暴露於油漆的油漆工人雙手發生皮膚鱗狀上皮細胞癌的病例。（中台灣醫誌 2007;12:235-9）

## 關鍵詞

職業暴露，油漆，皮膚，鱗狀上皮細胞癌

---

聯絡作者：張靖梅

地址：435 台中縣梧棲鎮中樓路1段699號

童綜合醫院 護理部

收文日期：2007年3月16日 修改日期：2007年5月25日

接受日期：2007年9月14日