



A CASE OF ORAL CAVITY SQUAMOUS CELL CARCINOMA IN AN ADULT FEMALE RHEBUS MONKEY (*MACACA MULATTA*)

Hong WANG^{1*}, De-Cheng WANG², Li-Xian CHEN¹ and Zhi-Gang CHEN¹


¹Yunnan Key Laboratory of Primate Biomedical Research and Kunming Biomed International, Kunming 650550, P. R. China.

²Medical Science College of China Three Gorges University, Yichang 443000, P. R. China.

ABSTRACT

Squamous cell carcinoma (SCC) in the oral cavity of a 14-year-old female rhesus monkey was observed under the microscope. The histopathologies revealed that the tumor was consisted of numerous SSC, which was a typical feature of human SCC. Haematology examination suggested an acute inflammatory process in this monkey. Although lots of cases of SCC were observed in the primates, this is the first case of oral cavity SCC in adult female rhesus monkey was reported, to our knowledge.

Key words: Oral cavity, Squamous cell carcinoma, Adult female *Macaca mulatta*.

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INTRODUCTION

Squamous cell carcinoma (SCC) is a stratified squamous epithelium composed of a malignant tumor. Spontaneous SCC usually originates in the squamous epithelial cells in primates such as human being [1], squirrel monkey[2, 3], cynomolgus monkey [4, 5], rhesus monkey [6, 7], capuchin monkey [8], red-faced monkey [9], sooty mangabey [10], orangoutang [11], white-lipped tamarin [12], baboon [13] and spider monkey[14]. Nonhuman primates (NHPs) may be a useful animal model for studying SCC [15]. The SCC in NHPs generally occurs buccal pouch, skin [16], stomach [17], lower jaw [18] and lung. To our knowledge, there is no report of oral cavity in adult female rhesus monkey until now. In this study, researchers present an oral

cavity SCC in an adult female rhesus monkey (*Macaca mulatta*).

A fourteen-year-old female rhesus monkey was presented in this case report. The rhesus monkey colony population had 825 animals (235 male and 590 female) during the 2-year period in Kunming Biomed International (KBI). Rhesus monkeys were housed in 20 shielding houses. Averaged bred approximately 41 animals per house. All the animals were fed twice a day with commercial monkey chew (crude protein 21.5%, and crude fat 6.8%), supplemented with fresh fruits and vegetables once a day. Monkeys were given free access to tap water, supplied by an automatic watering system. The animal facility of KBI was accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care International (AAALAC).

One morning, we found one female monkey was anorexia, tired state, lackluster fur, fleshless, submandibular swelling on the right cheek pouch with a white mass, the diameter about 1.8cm. Fed the

Corresponding Author

Hong WANG

Yunnan Key Laboratory of Primate Biomedical Research and Kunming Biomed International, Kunming 650550, P. R. China.

Email:- wangh@kbimed.com

monkey in single stainless steel cage indoor, and provided the monkey with digestible and well-fed food. Ten days later, we found the ulcer of the oral cavity around the mass; firstly we treated the monkey with penicillin and dexamethasone, and then cleaned the oral and cheek pouch with 0.1% potassium permanganate solution and hydrogen peroxide disinfectant. However, the treatment was ineffective. The situation of skin continued to fester, the ulcer lesions became larger, in which the typical oral cavity ulcers was observed (Fig. 1). The monkey was euthanized because of poor prognosis by 100mg/kg sodium pentobarbital solution under the authorization by the Institutional Animal Care and Use Committee (IACUC) of KBI.

Blood samples were obtained from the femoral vein using 2.5 ml syringe with 22 gauge needle, 1 ml blood with ethylenediamine tetraacetic acid-potassium (EDTA-K₂) for complete blood count (CBC) examinations using Sysmex Hemacytometer XT-2000i (Kobe, Japan). Analysis included cell count, such as neutrophil lymphocyte, monocyte, eosinophil, basophil, red blood cell. Moreover, some other parameters including hemoglobin, hematocrit, mean corpuscular volume, mean corpuscular hemoglobin, and mean corpuscular hemoglobin concentration were detected. We found that the neutrophil ($14.18 \times 10^9 / l$) and monocyte ($1.96 \times 10^9 / l$) were increased markedly, and decreased content of lymphocyte count ($3.22 \times 10^9 / l$), while the other haematological parameters were normal according with the reference range [19], suggesting an acute inflammatory process.

Collecting tissue around the oral cavity lesion and sections from liver, spleen, kidney and lung tissue were fixed in 10% formalin solution, then embedded in paraffin and prepared 5 μ m serial sections. After stained with haematoxylin and eosin (HE), all the slides were observed microscopically (Leica DM2500M).

Several pathological changes in the tissues around the oral cavity lesion were observed under the light microscope. Dispersive carcinoma nests were formed and could be seen in the dermis (Fig.2a, original magnification, 10X). And obvious

inflammatory cells infiltrated in the interstitial tissue (Fig.2b, original magnification, 20X). There were some keratinocytes and prickles cells could be seen in the carcinoma nests, in which a few cells were found at special division (Fig.2c, original magnification, 40X). However, there are not obvious pathological changes in the liver, spleen, kidney and lung. Based on these findings, this tumor in an adult female rhesus monkey was regarded as oral cavity low differentiated SCC.

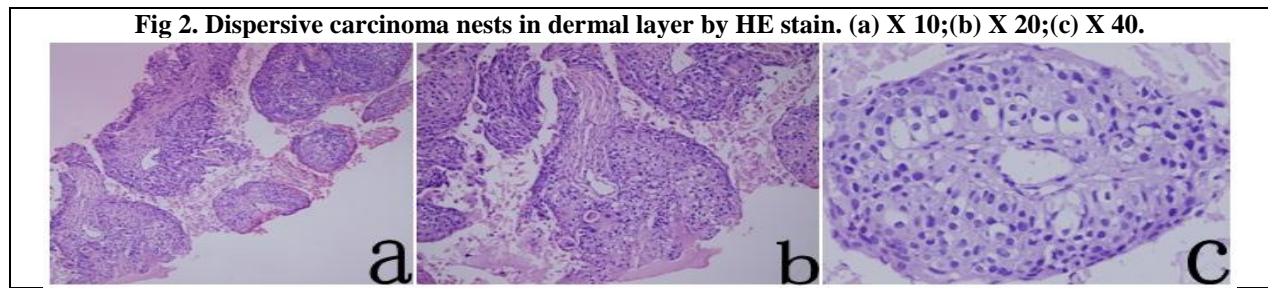
Since these histopathological features suggested the tumor cells have characteristics of squamous cells. This case was diagnosed as low differentiated SCC. No case of oral cavity in adult female rhesus monkey was reported, to our knowledge.

Several factors were reported to the SCC development in primates, Murad et al. documented that the change leisure habits involving greater exposure to sunlight have resulted in epidemic increases in the incidence of cutaneous SCC [19]. A relationship between SCC and papillomavirus infection has also been reported in humans [20]. SCC has been induced by carcinogen exposure in the trachea, lungs and esophagus in NHPs [21-25]. Trauma and pathogenic bacteria infection can cause SCC [26]; some cases of SCC in the oral cavity of young humans are closely related with viral infection such as EBV [27-32].

Oral cavity has an important function to eat food. Sharp foreign matter can puncture cheek pouch, oral cavity may be injured by fight, and open wound and food scraps can cause inflammation and ulceration of the oral cavity, and final deterioration may develop into cancer. In this case, dispersive carcinoma nests in dermal layer were obvious, and we could find a small number of keratinocytes and visible differentiation and prickles cell, and some inflammatory cells in the interstitial tissue resulted in secondary bacterial infection. Most notable among the haematology results were marked increased neutrophile and monocyte count, decreased lymphocyte count, suggesting an acute inflammatory response associated with cancerization.

Fig 1. Gross observation of oral cavity lesion





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CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

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