

Oral manifestations of HIV/AIDS in China: a review

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Abstract

Purpose The purpose of this study is to review the Chinese-language medical and dental literature from 1982 to 2008 on oral manifestations (OMs) of patients with HIV/AIDS for introducing the spectrum of OMs of the patients in China.

Materials and methods All data were extracted from 18 references which had used diagnostic criteria for HIV/AIDS. Four of the references had used the EC-Clearinghouse classification for oral lesions in HIV infection. The feasible overall rate and 95% confidence interval (95%CI) of the data on OMs were calculated.

Results Risk group analysis revealed that, of 203 patients, 64.3% were men and 35.7% were women (age range, 5 months to 64 years; mean age in three studies, 34.0, 34.3, and 36.1 years). Of these patients, 22.2% were infected by sexual contacts, 11.8% by intravenous drug use (IDU), 59.6% by blood or its products, 2.9% by mother to child transmission, and 3.4% were unclear. In 203 patients, oral candidiasis (OC) was the most common lesion (66%, 95%CI=59.48–72.52%), followed by herpes simplex (HS) (22.2%, 95%CI=16.48–27.92%), ulcerative stomatitis (14.8%, 95%CI=9.92–

19.68%), salivary gland disease (11.3%, 95%CI=6.94–15.66%), oral hairy leukoplakia (OHL) (9.8%, 95%CI=5.71–13.89%), necrotizing gingivitis (5.9%, 95%CI=2.66–9.14%), Kaposi's sarcoma (2.9%, 95%CI=0.59–5.21%), other malignant tumors (2.9%, 95%CI=0.59–5.21%), and linear gingival erythema (2.0%, 95%CI=0.07–3.93%).

Conclusions The spectrum of OMs reported from China is similar to that described in the international literature. Present data are useful to supplement international resources of HIV/AIDS research.

Keywords AIDS · HIV · Oral manifestations · Prevalence · People's Republic of China

Introduction

The first two patients with AIDS in China were found in 1985. This first report changed the assumption that China was not affected by HIV/AIDS, although these two cases were foreign visitors to China. The first case of a Chinese citizen with HIV infected by sexual contact was found in 1988 and reported by Qin et al. [20]. Since that time, HIV infection and AIDS have become a big medical and social problem as in many countries worldwide. UNAIDS China estimated a total of 650,000 (range 390,000 to 1,100,000) people in the end of 2005 in China living with HIV/AIDS, whether or not they had developed symptoms of AIDS or not [26]: 75,000 (range 65,000 to 85,000) had developed symptoms of AIDS, 70,000 (range 60,000 to 80,000) had acquired new HIV infection, and 25,000 (range 20,000 to 30,000) deaths were estimated, having occurred since 1985. Recently, the Chinese State Council AIDS Working Committee Office and UN Theme Group on AIDS published estimated results on HIV/AIDS in China at the

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end of December 2007: there were approximately 700,000 (range 550,000–850,000) people with HIV infection, 50,000 (range 40,000–60,000) new infections with HIV, and 20,000 (range 15,000–25,000) AIDS death cases had occurred in China [8].

Oral manifestations (OMs) of HIV/AIDS are an important field in clinical HIV/AIDS research. Oral lesions often manifest early in the course of HIV disease and may be easily diagnosed. Some of the OMs have been shown to be predictors of the course of HIV disease. Since little information on the status of OMs in HIV/AIDS in China is available, it was the aim of the present review to introduce results of studies on OMs in patients with HIV/AIDS in China and to make these data available to those colleagues who cannot read literature in Chinese.

Materials and methods

Chinese-language literature published in Chinese medical and dental journals from 1982 to 2008 in the Chinese Journal Full-text Database, China Academic Library and Information System, and Chinese Journal database were searched in the Internet. One hundred fifty-two references were found by using the search terms “HIV,” “AIDS,” and “oral manifestations.” Two reviewers (XLZ and YS) read abstracts and/or full texts of all articles to select potential available articles. Eighteen references could only be selected for this review by the following inclusion criteria: (1) Generally, there were two kinds of diagnostic criteria for HIV/AIDS, which were used in the references: (a) criteria according to the Centers for Disease Control of USA [3] and (b) criteria according to the “Chinese National Standard for diagnostic criteria and principles of management of

HIV/AIDS” [7]. (2) Diagnostic criteria for OMs were either based on the EC-Clearinghouse classification for oral lesions in HIV infection [11] in some references [4, 5, 18, 25] or on individual diagnoses based on clinical findings (OC, OHL, oral ulcer, and HS) and/or microbiology in other ones [9, 10, 12–17, 23, 24, 27–30].

Data synthesis

Where feasible, the overall rate and 95% confidence interval (95%CI) were calculated by merging data of OMs in patients with HIV/AIDS ($n=203$). Data of calculation and synthesis were completed by the Excel 2003 software.

Results

In Table 1, selected OMs in 1,745 patients with HIV/AIDS from 14 publications are shown. Except one article [23], all others had reported on OC, the prevalence of which ranged between 9.7% and 46.6%. Three publications [16, 24, 29] further reported on OHL (43.6%, 30.3%, and 26.3%, respectively). Oral ulceration was seen in 31.5% [23], 9.8% [9], and 19.6% [15]. Herpes simplex (0.7%) was observed in one study [13].

Risk analysis of 1,745 patients revealed that 1,356 (77.7%) were men and 389 (22.3%) were women of an age range between 1 and 74 years. Average age of patients was between 30 and 39 years in most reports, except 21.7 years [10], 29.5 years [29], and 42 years [12]. The most common mode of transmission of HIV infection was by intravenous drug use (IDU) in 675 cases (38.7%), followed by sexual contacts in 477 cases (27.3%), and transfusion of blood or blood products in 274 cases (15.7%).

Table 1 OMs in patients with HIV/AIDS in which the EC-Clearinghouse classification of OM has not been used

Authors	Patients (<i>n</i>)	Oral candidiasis, <i>n</i> (%)	Hairy leukoplakia, <i>n</i> (%)	Oral ulcer, <i>n</i> (%)	Herpes simplex, <i>n</i> (%)
Zhang et al. [30]	239	33 (13.8)			
Yin et al. [28]	31	3 (9.7)			
Dong et al. [10]	19	2 (10.5)			
Song et al. [23]	146			46 (31.5)	
Tang et al. [24]	55	17 (30.9)	24 (43.6)		
Yao et al. [27]	30	8 (26.7)			
Dai et al. [9]	143	16 (11.2)		14 (9.8)	
Lu et al. [17]	84	9 (10.7)			
Huang et al. [12]	34	7 (20.6)			
Lu and Hu [16]	178	83 (46.6)	54 (30.3)		
Liu et al. [14]	54	17 (31.5)			
Liu et al. [15]	46	7 (15.2)		9 (19.6)	
Zhang et al. [29]	19	2 (10.5)	5 (26.3)		
Liu et al. [13]	667	229 (34.3)			5 (0.7)

Table 2 General clinical data of patients with OM diagnosed according to the EC-Clearinghouse classification of OM

Authors	Patients, <i>n</i> (%)			Age (years) (mean)	Modes of HIV infection, <i>n</i> (%)				
	Total	Men	Women		Sexual contact	IDU	Blood/its products	Mother to child	Not clear
Chen et al. [5]	7	^a	^a	31–45 ^a			6 (85.7)	1 (14.3)	
Ma et al. [18]	60	38 (63.3)	22 (36.7)	7–60 (34.3)	10 (16.7)		48 (80.0)	2 (3.3)	
Tao et al. [25]	64	53 (82.8)	11 (17.2)	5 months–64 years (36.1)	30 (46.9)	24 (37.5)	3 (4.7)		7 (10.9)
Chen and Chen [4]	72	35 (48.6)	37 (51.4)	5–64 (34.0)	5 (6.9)		64 (88.9)	3 (4.2)	
Total	203	126 (64.3) ^b	70 (35.7) ^b	5 months–64 years	45 (22.2)	24 (11.8)	121 (59.6)	6 (2.9)	7 (3.4)

^a There were no original data

^b The gender rate was calculated using *n*=196 because seven cases of Chen et al. [5] had no gender data

Both modes of sexual contact and IDU were reported in 95 cases (5.4%), and mother to child transmission was recorded in 22 cases (1.3%). In 202 cases (11.6%), the mode of transmission was unclear.

Table 2 shows the general clinical data of 203 patients from four publications [4, 5, 18, 25]; 64.3% were men and 35.7% were women. Age of patients ranged from 5 months to 64 years. Average age of patients was 34.0–36.1 years [4, 18, 25]. The most common mode of transmission of HIV

was transfusion of blood or blood products in 121 cases (59.6%), followed by sexual contacts in 45 cases (22.2%), IDU in 24 cases (11.8%), and mother to child transmission in six cases (2.9%). Mode of transmission was unclear in seven cases (3.4%).

Table 3 shows data of OMs of 203 patients with HIV/AIDS. OM was found in 177 cases (87.2%, 95%CI=82.60–91.80%). The most common finding was OC in 134 cases (66.0%, 95%CI=59.48–72.52%). Among the 134 cases of

Table 3 OMs of patients diagnosed according to the EC-Clearinghouse classification of OM

Authors Patients	Chen et al. [5]	Ma et al. [18]	Tao et al. [25]	Chen and Chen [4]	Total	95%CI (%)
Cases with oral manifestations	7 (100.0)	60 (100.0)	48 (75.0)	62 (86.1)	177 (87.2)	82.60 to 91.80
Candidiasis					134 (66.0)	59.48 to 72.52
Unclassified		39 (65.0)		52 (72.2)	91 (44.8)	37.96 to 51.64
Pseudomembranous	4 (57.1)		19 (29.7)		23 (11.3)	6.94 to 15.66
Angular cheilitis			11 (17.2)		11 (5.4)	2.29 to 8.51
Erythematous			9 (14.1)		9 (4.4)	1.58 to 7.22
Hairy leukoplakia	2 (28.6)	13 (21.7)	2 (3.1)	3 (4.2)	20 (9.8)	5.71 to 13.89
Kaposi’s sarcoma	3 (42.9)		1 (1.6)	2 (2.8)	6 (2.9)	0.59 to 5.21
Linear gingival erythema			4 (6.3)		4 (2.0)	0.07 to 3.93
Necrotizing gingivitis	4 (57.1)	2 (3.3)	3 (4.7)	3 (4.2)	12 (5.9)	2.66 to 9.14
Non-Hodgkin’s lymphoma		1 (1.7)			1 (0.5)	–0.47 to 1.47
Ulcerative stomatitis	6 (85.7)	2 (3.3)	11 (17.2)	11 (15.3)	30 (14.8)	9.92 to 19.68
Salivary gland disease					23 (11.3)	6.94 to 15.66
Dry mouth			20 (31.3)		20 (9.8)	5.71 to 13.89
Swelling of glands			1 (1.6)	2 (2.8)	3 (1.5)	–0.17 to 3.17
Herpetic stomatitis	2 (28.6)	6 (10.0)	6 (9.4)	31 (43.1)	45 (22.2)	16.48 to 27.92
Herpes zoster	3 (42.9)	1 (1.7)	3 (4.7)		7 (3.4)	0.91 to 5.89
Recurrent aphthous stomatitis		3 (5.0)			3 (1.5)	–0.17 to 3.17
Malignant pleomorphic adenoma		1 (1.7)			1 (0.5)	–0.47 to 1.47
Other malignant tumors				6 (8.3)	6 (2.9)	0.59 to 5.21

OC, 91 cases (44.8%, 95%CI=37.96–51.64%) were not subclassified into pseudomembranous or erythematous types or angular cheilitis. Twenty-three cases (11.3%, 95%CI=6.94–15.66%), however, were diagnosed as pseudomembranous, 11 cases (5.4%, 95%CI=2.29–8.51%) as angular cheilitis, and nine cases (4.4%, 95%CI=1.58–7.22%) as erythematous lesions. Herpetic stomatitis was described in 45 cases (22.2%, 95%CI=16.48–27.92%), ulcerative stomatitis in 30 cases (14.8%, 95%CI=9.92–19.68%), salivary gland disease in 23 cases (11.3%, 95%CI=6.94–15.66%), OHL in 20 cases (9.8%, 95%CI=5.71–13.89%), necrotizing gingivitis in 12 cases (5.9%, 95%CI=2.66–9.14%), herpes zoster in seven cases (3.4%, 95%CI=0.91–5.89%), oral Kaposi's sarcoma (OKS) in six cases (2.9%, 95%CI=0.59–5.21%), other malignant tumors in six cases, and linear gingival erythema in four cases (2.0%, 95%CI=0.07–3.93%).

Discussion

This review has revealed that relatively few publications on OMs in HIV/AIDS have been published in Chinese, indicating that the significance of these lesions is not fully appreciated at present. Also, the number of publications adhering to internationally accepted criteria for diagnosis of OMs in patients with HIV disease is small. These facts make comparison with the international literature difficult. The heterogeneity of the material studied for this review also relates to differences in risk groups, a fact which may be explained by the different origins (provinces) of studies. It seems, however, that IDU is still one of the leading causes in HIV infection in China. This was confirmed by the Chinese State Council AIDS Working Committee Office and UN Theme Group on AIDS [8]. In this report, the high risk groups were: IDU (42%), men who had sex with men (MSM, 12%), and sex workers (SW, 26%) in 50,000 new infections in 2007. The risk group characteristics of 1,745 patients (of which the OMs have been described in Table 1) were: IDU 38.7%, sexual contact 27.3%, blood or its products 15.7%, both sexual contact and IDU 5.4%, and mother to child transmission 1.3%. The rather high prevalence of 59.6% of transmission by blood or its products in four publications (Table 2) must be explained by the specific hospital setting in which the patients have been studied. Of interest is that, in the articles for the present review, no specific figures on mode of transmission of HIV in SWs and MSM were available. Instead, authors tended to refer to sexual contact in general.

Present data clearly showed that the majority of patients with HIV disease were men (77.7% and 64.3% in Table 2). Similar figures have been reported in some studies from Thailand (72.6%) [19] and India (72.2%) [22]. Present data

showed mean age to range in the third decade of life. This was slightly higher than in a study from Thailand (28 years) [19] but similar to studies from Cambodia and India (32 and 35.3 years, respectively) [2, 22]. This review did not yield any detailed descriptions of the clinical characteristics of OMs in children despite of the fact that there were a number of pediatric patients.

The prevalence of OMs was 33.5% in 1,745 patients reported in Table 1 compared to 87.2% in 203 patients in Table 3. In this context, it is important to know that findings summarized in Table 1 were published by general medical doctors while those summarized in Table 2 were accumulated by dentists with the latter probably being more specific in diagnoses of oral mucosal diseases. High prevalence figures were also reported from other parts of Asia: India (72%) [21], Thailand (82%) [19], and Cambodia (90%) [2].

Generally, oral candidiasis is strongly associated to HIV/AIDS. In this review, prevalence of OC ranged from 9.7% to 46.6% (Table 1) and was as high as 66.0% in four dental publications. In other studies, the prevalence of OC was 55.1% [6] and 98% [1]. In the present data, 44.8% of cases of OC (Table 3) were not further subclassified. In the subclassified cases, the pseudomembranous type was most common (29.7%), followed by the erythematous type (17.2%), and angular cheilitis (14.1%). The order was similar to a study from Zimbabwe [6] but different from an Indian study [22]: most common was the erythematous type, followed by the pseudomembranous type, and angular cheilitis. In the present review, the prevalence of OHL ranged between 26.3% and 43.6% (Table 1) and 3.1% and 28.6% (Table 3). Prevalence figures from other regions also showed considerable variations: 45.5% in a Cambodian study [2], 15.8% in an Indian study [22], 2.7% in a South Indian study [21], and 1.3% in patients from Zimbabwe [6]. Reasons for the variation of prevalence of OHL may be related to risk groups, gender, age, status of HIV disease, and medication, but might also be ascribed to lack of proper diagnostic criteria, e.g., not to differentiate between OC and OHL. In the present data, prevalence of OKS was 2.9%. In previous studies, no case of KS was reported from South India [21] and Cambodia [2]. HIV/AIDS patients from Zimbabwe, however, had developed KS in 18.6% [6]. Prevalence of linear gingival erythema and necrotizing gingivitis was 2.0% and 5.9%, respectively (Table 3). Sharma et al. reported linear gingival erythema in 15.8% of patients and necrotizing ulcerative gingivitis in 0.9% [22]. Linear gingival erythema was reported in 16% of Indian patients [21]. High prevalence (27.7%) of necrotizing ulcerative periodontitis was reported by Bendick et al. [2]. Prevalence of non-Hodgkin's lymphoma was 0.5% (Table 3). In previous reports, the prevalence of non-Hodgkin's lymphoma was 7.1% [6] and 4.0% [19]. In contrast, no case of non-Hodgkin's lymphoma was reported in an Indian

study [21]. Some less common OMs associated with HIV infection are also shown in Table 3. The prevalence of ulcerative stomatitis, herpetic stomatitis, and recurrent aphthous stomatitis was 14.8%, 22.2%, and 1.5%, respectively. The prevalence of other OMs like dry mouth, swelling of major salivary glands, and other malignant tumors was low.

The present review has only revealed a relatively small number of papers devoted to research on OMs of HIV disease in China. Most references selected for this review were case series without a prospective, controlled randomized design, a fact that limited the possibilities of a meta-analysis of data. Thus, for this review, only the 95%CI of OMs could be calculated besides the overall rate. In this study, varied overall rate of different OMs was calculated using four studies in which the number of individuals was limited, even when pooling them. In addition, some of the lesions were not reported in all four studies so that the total overall rate was only an estimated point value for each oral lesion. The 95%CI was used to indicate the reliability of an estimate value. The calculated figure of 95%CI gave an interval value which was more reliable than a point value to reflect the probability of any given lesion.

While the spectrum of OMs in patients with HIV disease from China appears to be similar to that reported from other areas of the world, the prevalence of some OMs seems to vary. Differences of prevalence of OMs may have many reasons, among which the following may be discussed: diagnostic criteria and facilities, different risk groups, different ethnic groups, differences in daily living conditions, and differences in general health care including medication.

Conclusions

1. The spectrum of OMs in Chinese patients with HIV disease is comparable to that described in the international literature, particularly from regions including South and Southeast Asia.
2. In a number of publications from China, the description of OMs was less detailed. Especially, there were no data on OMs in children.
3. Signs and symptoms of OMs for early diagnosis, progression of HIV disease, and therapy need to be taken into consideration by Chinese medical and dental professionals dealing with HIV/AIDS patients.

References

1. Anil S, Challacombe SJ (1997) Oral lesions of HIV and AIDS in Asia: an overview. *Oral Dis* 3(Suppl 1):S36–S40
2. Bendick C, Scheifele C, Reichart PA (2002) Oral manifestations in 101 Cambodian patients with HIV infection and AIDS. *J Oral Pathol Med* 31:1–4
3. Centers for Disease Control (1986) Update: acquired immunodeficiency syndrome United States. *Morb Mortal Wkly Rep* 35:17–21
4. Chen CR, Chen JG (2006) Oral manifestations in 72 patients with HIV/AIDS. *J Clin Stomatol* 22:688–690 (in Chinese)
5. Chen JG, Xiang L, Gui XE, Li HF (2002) Oral manifestations in 7 patients with HIV/AIDS. *West China J Stomatol* 20:383–384 (in Chinese)
6. Chidzonga MM (2003) HIV/AIDS orofacial lesions in 156 Zimbabwean patients at referral oral and maxillofacial surgical clinics. *Oral Dis* 9:317–322
7. Chinese National Standard for diagnostic criteria and principles of management of HIV/AIDS:GB 16000-1995 (1995) Available at <http://www.down.foodmate.net/standard/sort/3/7670.html>
8. Chinese State Council AIDS Working Committee Office, UN Theme Group on AIDS in China (2007) A joint assessment report of HIV/AIDS prevention, treatment and care in China. State Council AIDS Working Committee Office, Beijing, pp 4–5
9. Dai Y, Li TS, Wang AX, Qiu ZF, Xie J, Han Y, Liu ZM, Ma XJ, Wang HL, Fan HQ, Li LY, Deng GH, Sheng RY (2006) Clinical characteristics of 143 Chinese HIV/AIDS patients. *Acta Acad Med Sin* 28:651–654 (in Chinese)
10. Dong TX, Wang YL, Wang P, Li YY, He L (2002) An analysis of 19 cases of HIV/AIDS in a general hospital. *J Clin Dermatol* 31:573–574 (in Chinese)
11. EC-Clearinghouse on Oral Problems Related to HIV Infection and WHO Collaborating Centre on Oral Manifestations of the Human Immunodeficiency Virus (1993) Classification and diagnostic criteria for oral lesions in HIV infection. *J Oral Pathol Med* 22:289–291
12. Huang SP, Li GG, Wang FB (2006) Analysis of clinical features of 34 patients with AIDS in 2005. *Chin J AIDS/STD* 12:548 (in Chinese)
13. Liu AM, Li YC, Zhang L, Zhao XY (2007) Clinical analysis of 667 HIV/AIDS patients. *Clinical Focus* 22:1714–1717 (in Chinese)
14. Liu L, Guan XQ, Wu XC (2007) Analysis of epidemic characteristics and co-infections of HIV/AIDS in Chongqing. *J Chongqing Med Univ* 32:632–634 and 637 (in Chinese)
15. Liu ZM, Li Q, Zou YS (2007) Analysis of 46 AIDS cases. *Parasitoses Infect Dis* 5:67–68 (in Chinese)
16. Lu SH, Hu RX (2007) Clinical analysis of AIDS-associated skin manifestations. *Southern China J Dermato-Venerol* 14:76–78 and 84 (in Chinese)
17. Lu XB, Zhang YX, Yibaguli A, Hu LP (2006) The clinical features of AIDS patients in Xinjiang. *J Xinjiang Med Univ* 29:738–739 (in Chinese)
18. Ma RY, Zhao QX, He Y (2004) Analysis of oral manifestations in 60 patients with HIV/AIDS. *Chin J Misdiagn* 4:1323 (in Chinese)
19. Nittayananta W, Chungpanich S (1997) Oral lesions in a group of Thai people with AIDS. *Oral Dis* 3(Suppl 1):S41–S45
20. Qin SL, Wang AX, Fan J, Chen DY, Li ST, Li XR (1989) The first case of HIV infection through sexual transmission in China. *Acta Academiae Medicinae Sinicae* 11:401 (in Chinese)
21. Ranganathan K, Reddy BVR, Kumaraswamy N, Solomon S, Viswanathan R, Johnson NW (2000) Oral lesions and conditions associated with human immunodeficiency virus infection in 300 south Indian patients. *Oral Dis* 6:152–157
22. Sharma G, Pai KM, Suhas S, Ramapuram JT, Doshi D, Anup N (2006) Oral manifestations in HIV/AIDS infected patients from India. *Oral Dis* 12:537–542
23. Song JX, Xing MY, Tan MG, Wu CM, Li GJ, Wang WH (2003) Analysis of clinical characteristics of 146 cases of HIV/AIDS. *J Huazhong Univ Sci Tech Health Sci* 32:625–627 (in Chinese)

24. Tang YB, Chen LJ, Tang XP, Chen WL, Yuan XZ (2003) Analysis of clinical and epidemic features of HIV infectors in Guangzhou. *Clin Med J Chin* 10:446–447 (in Chinese)
25. Tao RJ, Deng HJ, Ya ZK, Guo SZ, Liang SX, Liu W (2005) Investigation of oral lesions in 64 Chinese HIV/AIDS patients in Guangxi Province. *West China J Stomatol* 23:338–340 (in Chinese)
26. UNAIDS China (2006) HIV and AIDS estimates. Available at <http://www.unaids.org/enCountryResponses/Countries/china.asp>
27. Yao WH, Zhao W, Zhao H, Wei HX, Cheng C (2005) Analysis of clinical features of 30 patients with AIDS. *J Nanjing Med Univ* 25:601–602 (in Chinese)
28. Yin GZ, Su HY, Zhou J, Yang XW (2002) Clinical analysis of 31 cases of AIDS from Dali prefecture. *Chin J Prim Med Pharma* 9:313–314 (in Chinese)
29. Zhang GX, Liu CM, Zhao LL (2007) Analysis of clinical features of 19 cases of HIV/AIDS. *Chin J Clin Med* 13:1013–1014 (in Chinese)
30. Zhang XB, Cheng HH, Jia MH, Zhang JP (2000) Analysis of 239 AIDS cases reported in Yunnan. *J Chin AIDS/STD Prev Cont* 6:86–88 (in Chinese)