Comparison of the Inpatients Admitted during the Recent 5 Years (January 1994–December 1998) with Those Admitted during the Previous 5 Years (January 1989–December 1993): A Clinico–statistical Study

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Summary: As society ages, the composition of the diseases that occur within it changes accordingly. With that in mind, we examined the characteristics and trends in the recent inpatients and compared these recent inpatients with those of a previous report to identify the changes that accompany the aging of society. Subjects were 1,534 cases (men 56.9%, female 43.1%, average age 47.1 years) who were hospitalized at Kurume University Hospital for treatment during the 5-year period from January 1st, 1994 through December 31st, 1998. The ratio of inpatients over 65 years old was about 1.8 times higher than in the previous study, showing a clear trend toward an increased overall age of inpatients. As for the types of disease observed, the most common malignancies were epithelial tumor, followed by other benign tumors, as well as 76 cases which included diseases resembling tumor (epulis and exostosis etc.). A majority of the patients (55.6%) were directed to the Hospital by their dentist, a finding similar to that of the previous report. As for geographical distribution, 93.3% of the inpatients lived within 40 km of the center of Kurume City where our oral surgery is located, an increase of about 10% from the last report. In other words, our results showed a reduction in the sphere of treatment distribution.

Key words inpatients, clinico-statistical, oral surgery

INTRODUCTION

With the aging of society, the composition of the disease that occurs within society changes. Mitsufuji et al. [1] confirmed this in a clinico-statistical comparative investigation of inpatients during two different 5-year periods (1973-1977) and (1989-1993) in our department. We have compared a recent admitted group of inpatients with a group reported previously. We have examined the characteristics of and the trends among, the recent inpatients and compared them with those of the previous report to identify the changes associated with aging.

MATERIALS AND METHODS

Subjects were 1,534 cases (the second term) who were hospitalized in the department of oral surgery at Kurume University Hospital for treatment during the 5-years period from January 1st 1994 until December 31st, 1998. We compared our results with those of Mitsufuji et al. (the first term). Our department has 22 beds, the same as in the first term and continues to share a ward with the department of dermatology. Patients who were hospitalized more than once for the same disease were counted separately each time.

The following items were examined: 1) Sex and age, 2) Type of disease, 3) Requirement of anesthesia for the operation, 4) Occurrence of complications, 5) Term of hospitalization, 6) Route of admission to our

hospital, 7) Geographical distribution, 8) Change in inpatient number. These items were investigated by referring to hospitalization medical records. Complications for the purposes of this study did not take into account previous disease but included only diseases requiring medical treatment that were discovered during their hospitalization.

Statistical investigations were performed with χ^2 analysis.

RESULTS

Sex and age (Figs 1 and 2)

There were 873 males (56.9%) and 661 females (43.1%), with a ratio of males to females of 1.3:1. The number of female patients increased compared to the first term where there were 717 males and 465 females.

Patients in their sixties formed the largest group, followed by those in their seventies. There was little difference between the number of inpatients in their teens as compared with those in their forties. There were few infants and there was no difference in the ratio of infants between the first term and the second term. The results by age showed that there were more men than women among patients in their fifties or younger, whereas a majority of patients in their six-

ties were female. There was no gender gap after the age of seventy. The average age was 47.0 years, and the percentage of elderly patients of advanced age was 27.4% (420/1,534 cases) in the present term. This was a significant increase compared with 19.6% (232/1,182 cases) in the first term ($p < 0.01$). Compared with the 5 years from 1973 to 1977, the number of very elderly inpatients increased by 4.7 times in the first term and by 8.6 times in the second term, showing a clear increase in inpatient age. The ratio of superaged patients over 80 years old in the present study was 5.3% (81/1,534 cases), and this was slightly higher than the 4.5% observed in the first term.

Diseases (Fig. 3)

Cysts were the most common complaint at 21.4% of the total (329/1,534 cases) followed by malignant tumor, and trauma. The number of trauma cases was higher in the first term but decreased significantly in the second term, along with inflammation. The number of cases of disease of mucosal membranes, of disease of salivary gland, of extraction of teeth and so on more than doubled in the second term ($p < 0.0001$).

The ratio of patients over 65 years old showed a tendency to increase in each disease as compared with the first term. The ratio of malignant tumor was 56.9% (152/267 cases), little changed from the 53.3% in the first term. Significant increases were seen for trauma, benign tumors and other (Fig. 4).

Types of tumor (Fig. 5) : More than 90% of the malignancies were epithelial (92.2%, 248/267 cases). Of these, squamous carcinoma was the most common (235 cases) and the rest were salivary gland cancer. Regarding the breakdown of squamous carcinoma, the largest number of cases was tongue cancer (76 cases) followed by carcinoma of gingiva (59

Fig. 1. Sex.

Fig. 2. Age and sex distribution.

* $p < 0.0001$

Fig. 3. Diseases.

Fig. 4. Ratio of patients over 65 by disease.

Fig. 5. Types of tumor.

TABLE 1.
Cyst cases in the first and second term

	first term 237 cases	second term 329 cases
Odontogenic cysts (total)	171	247
radicular cyst	96	134
dentigerous cyst	42	61
primordial cyst	13	33
residual cyst	16	18
calcifying odontogenic cyst	4	1
Non-odontogenic cyst (total)	42	68
naso-palatine duct cyst	12	8
naso-alveolar cyst		1
median mandibular cyst	1	
simple bone cyst	5	13
postoperative maxillary cyst	22	45
aneurysmal bone cyst	2	1
Cyst in soft tissue (total)	24	14
ranula	19	9
mucous cyst	2	3
parotid gland cyst	1	
dermoid cyst	1	
epidermoid cyst	1	2

cases). Non-epithelial tumors occurred in 4.1% of the patients (11/267 cases); these consisted of malignant lymphoma (7 cases), melanoma (3 cases) and synovial sarcoma (1 case). The remaining 8 cases were metastasis, primarily to the lung (3 cases) and thyroid gland (2 cases). The tumors were primary in 210 cases and secondary in 57 cases.

As shown in Fig. 5, benign tumors were divided into odontogenic (32 cases), salivary glands (20 cases) and others (76 cases). The largest number of odontogenic cases were ameloblastoma 43.8% (14/32 cases), followed by odontoma. The largest number of cases in salivary glands were pleiomorphic adenoma 95% (19/20 cases) and the rest were Warthin tumor. "Other" included tumor-like lesions such as epulis (9 cases), torus (2 cases). This category included tumors in the soft tissue and tumors in the maxilla. The main tumors in the former group were hemangioma (15 cases), fibroma (11 cases) and papilloma (11 cases), and in the latter group were osteogenic fibroma (2 cases), chondromyxoid fibroma (1 case), and so on.

Cysts (Table 1) : Odontogenic cysts in the maxilla comprised 75.1% (247/329 cases) of the total. The next most common type of cyst was the non-odontogenic cyst, which occurred in 20.6% of the cases (68 cases). Both had increased from the 72.2% and 17.7%, respectively, observed in the first term ($p < 0.0001$). Cysts in soft tissue has decreased to 4.3% of the total (14 cases) from 10.1% (24 cases) in the first term ($p < 0.005$).

Fractures and trauma (Table 2) : By location, mandible fracture comprised 81.0% (205/253 cases) of the total, a significant increase ($p = 0.02$) compared with the 64.1% (207/323 cases) in the first term. Fracture of the maxilla and complications involving the mandible decreased. Fractures of the alveolar bone showed a particularly sharp decline. The time of initial examination was divided into fresh cases, seen within 10 days of the trauma, and old cases, seen more than 10 days after the trauma. Old cases decreased by only one case in the second term. Other complications were about the same as in the first term.

Malformations (Table 3) : Malformations of jaw and palate comprised 8.0% (2/25 cases) of the total, a significant decrease compared with 48.0% (12/25 cases) in the first term ($p < 0.005$). In the first term 88.0% (22/25 cases) were Gnathometatypical which was 2.4 times higher than in the second term (36.0%, 9/25 cases), and the most common complaint was mandibular protrusion.

TABLE 2.
Fractures and trauma

complication	fresh cases		old cases		others	
	first	second	first	second	first	second
mandibule	207	205	7	1	10	10
maxill	9	4				2
zygoma	15	10	2			
mandibule+maxill	17	5			1	
mandibule+zygoma	6	5	1			
maxill+zygoma	11	4				1
mandibule+maxill+zygoma	21	4	1		2	
alveolar bone	37	8	1		1	
mandibule+alveolar		6				
maxill+alveolar		1				
maxill+zygoma+alveolar		1				
total	323	253	12	1	14	13

TABLE 3.
Malformation cases

	first term	second term
total malformation	12	2
jaw and palate	4	0
cleft palate	3	1
post operative cleft lip	5	0
other	0	1
total metatypical	13	23
traumatic scar	4	1
gnathometatypical	9	22

TABLE 4.
Operative cases requiring anesthesia

	first term cases (%)	second term cases (%)
general anesthesia	531 (55.1)	911 (65.0)
local anesthesia	433 (44.9)	491 (35.0)
total	964 (100.0)	1402 (100.0)

Operative cases requiring anesthesia (Table 4)

General anesthesia was applied in 65.0% of the cases (911/1,402) in the second term, which was an increase over the 55.1% observed in the first term. Local anesthesia was 35.0% of the cases (491/1,402) in the second term.

Occurrence of complications (Fig. 6)

Previous known diseases were not considered.

Fig. 6. Prevalence of complication by disease.

We investigated the ratio of inpatients who required medical treatment for other general diseases which were discovered while they were in hospital. Such other general diseases were discovered in 23.8% of the total (281/1,182) in the first term, but this ratio increased significantly to 39.7% (609/1,534, $p < 0.0001$) in the second term. Cardiovascular disease was most prevalent at 18.9%, followed by diseases of the digestive system. The category of "Other" included eye disease, mental disease, allergic disease etc.

Period of hospitalization

Malignant tumor, trauma and malformation required more than 30 days of hospitalization on average. However, many malignant tumor patients required more than 150 days and the total average duration of hospitalization was 26.1 days.

Route of admission (Fig. 7)

Most patients were admitted to hospital by their

Fig. 7. Route of admission.

Fig. 9. Change in number of inpatients.

dentist (55.6%), and this was similar to the results in the first term (57.3%). However, admissions by physicians decreased from 27.1% to 20.9%.

Geographical distribution of inpatients (Fig. 8)

We investigated the ratio of inpatients who lived within 40 km, 40 km to 80 km or over 80 km of our hospital. Figure 8 shows that 93.3% of the inpatients came from within 40 km (1,425/1,527 cases), which was a significant increase compared with the 87.1% (1,029/1,182 cases) in the first term ($p < 0.0001$). The decrease in the number of patients living over 40 km from the hospital suggested a shrinking of the medical care zone.

Fig. 8. Geographical distribution of inpatients.

Change in number of inpatients (Fig. 9)

The average annual number of inpatients has increased by about 1.6 times in the last 20 years, from 236 cases (in the first term) to 307 cases (in the second term).

DISCUSSION

There are many clinico-statistical comparative reports of investigations in oral surgery [2-13]. But these were difficult to compare because of difference in region or scale, or because of close relationships with a particular region, university or college.

Our hospital serves the Chikugo medical care zone to the south of Fukuoka City, bordered to the south by Kumamoto Prefecture, to the southeast by Saga Prefecture and to the northeast by Oita Prefecture. The elderly population of this region has been increasing year by year. We found that in the region to the south of Fukuoka (7 cities, 8 counties), 19.8% of the population was over 65 years old (172,517 of 873,494) as of November 1999. This ratio has increased compared with the 17.5% report-

ed as of November 1995. Reflecting this change, the ratio of elderly patients increased from 19.6% in the first term to 27.4% in the present term. Compared with the results for the 1973-1977 period, the ratio of elderly patients increased by 4.7 times in the first term and by about 8.6 times in the second term. These results clearly suggest an increase in the elderly population. We found that the increase in elderly patients improved the male/female inpatient ratio from 1.5:1 to 1.3:1; if the increase in the elderly population continues, this differential may be expected to shrink further.

Regarding the types of disease treated, cyst, malignant tumor, inflammation and benign tumor comprised about 2/3 of the inpatient total, and this was not significantly different from the results in the first term. On the other hand, trauma cases decreased significantly compared with the previous study. "Other" included diseases of the salivary gland such as sialolithiasis, mucosal disease, including leukoplakia, herpes infection and extraction of teeth. As may be seen from the ratio of elderly patients by disease, this increase as well as the increase in complications might be expected because leukoplakia is regarded as a precancerous condition. We predict that the diseases in the category "other" will continue to increase in future, too. We also consider that a number of the items in "other" will need to be taken up as independent lesions. Comparing our findings with those of other reports [2-13], cyst, inflammation and trauma were consistently the main complaints. Further, a decrease in trauma was also reported by Miyagi et al. [2] at Ryukyu University and O-yama et al. [3] at Shiga University. We suggest that this may be due in part to improvement in plastic surgery treatment at secondary emergency hospitals. We suspect that the increase in seat belt use and improved safety checks have contributed to a decrease in trauma from traffic accidents, and that the decrease in hard play or exercise with aging may be a factor in this decrease in general trauma. The ratio of patients over the age of 65 by disease showed tendency to decrease in any report, and malignant tumors consistently comprised more than half the total.

The characteristic that showed the most obvious change in the second term was the increase in complications. The prevalence this time was 39.7% (609/1,534 cases) which was a significant increase compared with 23.8% (281/1,182 cases) in the first term. There was increase in complications for every disease, and the increase in cardiovascular disease

and digestive system disease particularly stood out. Inpatients over 65 years old comprised 65.7% of total cardiovascular disease (190/289 cases), 70.8% (17/24 cases) of cerebrovascular disease, and 56.1% (60/107 cases) of metabolic disease. This situation requires increased consultation with doctors in other departments, and suggests that treatment will tend to become more complicated. We predict that this tendency will become stronger in future. With regard to the period of hospitalization, Taneda et al. [8] reported that the longest period was required for malignant tumor (average 62.9 days for the past 6 years), but our present investigation showed that the average period of hospitalization was 46.8 days, which was still longer than in any other diseases, and that the longest term was 199 days. The increase in prevalence of malignant tumor was second only to that of cyst, and we may forecast that malignancies will increase further in future. Therefore, we may predict an extension of the average period of hospitalization. Concerning younger patients, there has been an increase in gnathometatypical disease and a decrease of cleft lip or jaw malformation. Kizumino et al. [12] at Tokyo Dental College reported that gnathometatypical diseases comprised 1,185 cases or about 40% of operations in the last 9 years, and we suggest that these numbers will continue to increase.

By region, shrinkage of the medical care zone was found to have progressed. We think that this is probably due to increased numbers of and improved preparedness at secondary medical institutions. However, further changes of medical care zone may be expected if the proposal to change national medical universities into independent foundations as of fiscal 1998 is implemented.

With the aging of our society the types of medical complaints and complications among aged patients are on the increase, and the shrinkage of the medical care zone shows that the medical institutions are changing. Given these circumstances, we believe that it is necessary to become more aware of the role of primary medical institutions, and to develop a system capable of meeting future demand.

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