

## Clinical Effect of Infusion Therapy in Combination with Local Antimycotic Drugs on Acute Pseudomembraneous Candidiasis Induced by Removable Dentures

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### ABSTRACT

Denture stomatitis is often observed in the denture-bearing mucosa. *Candida albicans* and related species are now believed to play a major role as a pathogenic factor in denture stomatitis. If systemic predisposing factors are present, denture stomatitis will sometimes develop into acute pseudomembraneous candidiasis. In acute pseudomembraneous candidiasis, the patients cannot take foods, and dehydration often occurs. This vicious cycle is the most important cause of increase in the growth of *Candida* species. Therefore, in order to improve the patient's physical condition, infusion therapy will be the first choice of treatment. The purpose of this study was to investigate the clinical effect of infusion therapy in combination with local antimycotic drugs on this type of candidiasis.

We observed 4 cases of acute pseudomembraneous candidiasis induced by removable dentures and tried to treat these patients with infusion therapy (5% dextrose in lactated-Ringer's solution) and local antimycotic drugs (Nystatin ointment or 1% Miconazole nitrate cream). The acute inflammatory symptoms were significantly decreased by this therapy.

The result of this study indicated that infusion therapy in combination with local antimycotic drugs was clinically effective on acute pseudomembraneous candidiasis induced by *Candida*-induced denture stomatitis.

Denture stomatitis is a term used to describe inflammatory changes occurring in the denture-bearing mucosa. *Candida albicans* and related species are now believed to play a major role as a pathogenic factor in denture stomatitis<sup>1,2,4,5,14,15</sup>.

*C. albicans* is a weak pathogen. But when predisposing factors are present, infection of the oral mucosa may occur and acute pseudomembraneous change is induced. These predisposing factors include chronic disorders, previous drugs therapy (i.e, antibiotics, corticosteroids) and for-

eign body in the oral cavity (i.e, nasogastric tube, endotracheal tube, removable denture)<sup>12,18</sup>.

We observed 4 cases of acute pseudomembraneous candidiasis induced by removable dentures and tried to treat these patients with infusion therapy and local antimycotic drugs. All 4 cases were classified according to Newton's and Lehner's classification of oral candidiasis<sup>11,13</sup>. The purpose of this study was to investigate the clinical effect of infusion therapy in combination with local antimycotic drugs on this type of *Candida*-induced denture

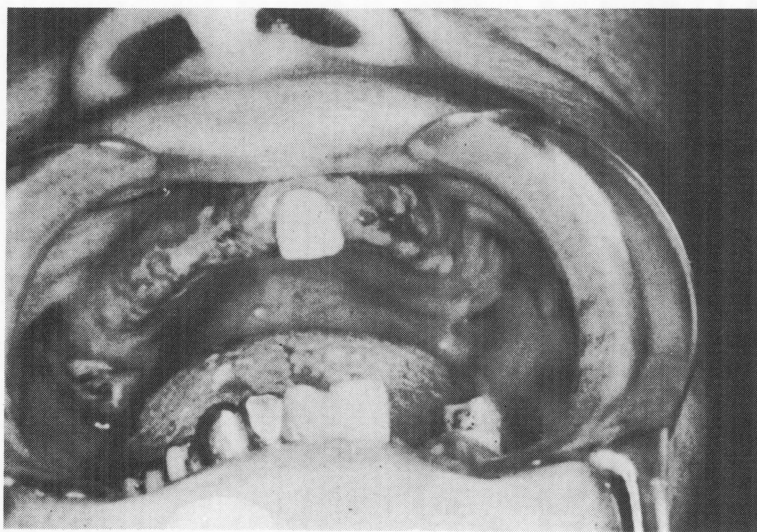


Fig. 1. Clinical appearance of oral candidiasis.

stomatitis.

#### PATIENT HISTORY

Four patients who had been suffering from severe pain and pseudomembraneous inflammation of the oral mucosa were included in this study. They all were diagnosed as acute pseudomembraneous candidiasis from the clinical signs and identification of *C. albicans* using a new liquid medium specific for *Candida* species (STOMASTAT).

Patient No. 1. (Fig. 1) A 57-year-old woman had a pain and pseudomembraneous change in the maxillary mucosa. She had a left incisal tooth and was wearing an upper partial denture. The pseudomembraneous change of the denture-bearing mucosa developed suddenly and coincided with marked fatigue due to her hard farming activities. She could not use her denture because of severe pain. Treatment consisted of the addition of a soft lining material to the denture fitting surface and infusion therapy with 5% dextrose in lactated-Ringer's solution. We used Mollosil (Molloplast KG Kostner & Co.) as a lining material and infusion therapy was continued for 5 days (500 ml/day). Nystatin ointment (100,000 units/g) was applied to the surface of the lining material. After 3 days, the acute inflammatory symptoms significantly decreased. Eight kg of her body weight were lost in a week.

Patient No. 2. A 73-year-old man who was wearing upper and lower full dentures had a pain and pseudomembraneous or aphthoid change of the oral mucosa. He had the complication of cerebral thrombosis. The construction of new dentures was started. When we reached the stage of occlusal registration, the mucosal inflammation occurred suddenly. He could not take foods at all and the following treatment was started: 5% dextrose in lactated-Ringer's solution (500 ml/day) was injected intravenously for 5 days; Nystatin ointment (100,000 units/g) was applied to the fitting surfaces of the both dentures. The mucosal redness and pain disappeared completely after 3 days.

Patient No. 3. A 47-year-old man had sore mouth and redness of his oral mucosa. He had lost his upper and lower dentures. He had some decayed teeth which were not possible to be conserved due to severe pyorrhea and decay. After extracting these teeth, 5% dextrose in lactated-Ringer's solution (500 ml/day) was intravenously for 7 days. Nystatin ointment (100,000 units/g) was applied to the upper mucosal surface. The mucosal soreness completely disappeared after 3 days. But the redness of the mucosa was not improved by Nystatin therapy. His body weight reduced 10 kg in a week.

Patient No. 4. A 83-year-old man who was wearing upper full denture and lower partial one had severe pain and aphthoid or pseudomem-

braneous change of the oral mucosa. He could not take foods at all for 5 days. The following treatment was started: 5% dextrose in lactated-Ringer's solution (500 ml/day) was injected intravenously for 3 days; 1% Miconazole nitrate cream was applied to the fitting surfaces of the both dentures. The oral mucosal inflammation was improved after 5 days. His body weight did not reduce in a week.

All cases were classified as Lehner's type 1 oral candidiasis become worse from Newton's type 2 denture stomatitis because of the patients' fatigue or dehydration.

### A SELECTIVE LIQUID MEDIUM FOR *CANDIDA* SPECIES

A simple liquid, selective isolation medium for *Candida* species, was made for diagnosing oral candidiasis. This medium was named STOMASTAT (SANKIN Co.) which consisted of glucose 4%, polypepton 1%, chloramphenicol 0.01% and chlorophenol red 0.006%. Chloramphenicol was added to inhibit the growth of other microorganisms and chlorophenol red was utilized as pH-indicator. The total volume of STOMASTAT was 2 ml and the initial pH was prepared at 5.80. The color of this medium changes from red to yellow following the pH change to under 5.0<sup>7,10</sup>. The samples were taken with swabs from the lesions and were inoculated into STOMASTAT. After incubation for 24 hr at 37°C, the color of this medium was observed. The microorganisms in a color-changed medium were identified. In this study, the color of STOMASTAT was changed from red to yellow and *C. albicans* was detected in each case.

### DISCUSSION

Denture stomatitis can be graded clinically into three types according to Newton's classification as follows<sup>4,13,15</sup>:

Type 1: pin-point hyperemia,

Type 2: diffuse erythema,

Type 3: papillary hyperplasia.

It is believed that the significant causes of denture stomatitis are *Candida* species and among them *C. albicans* is the major pathogen. However, Type 1 denture stomatitis is mostly caused by occlusal trauma<sup>4</sup>. In Lehner's classification of oral candidiasis, denture stomatitis is described as the chronic atrophic candi-

diasis<sup>9,11</sup>:

Type 1: acute pseudomembraneous candidiasis (thrush),

Type 2: acute atrophic candidiasis (antibiotic stomatitis),

Type 3: chronic atrophic candidiasis (denture sore mouth),

Type 4: chronic hyperplastic candidiasis (candidal leukoplakia),

Type 5: endocrine candidiasis syndrome.

*C. albicans* is a poor pathogen and infection, either locally or systemically, does not occur unless predisposing factors are present. Dentures and poor oral hygiene conditions are the primary predisposing factors to develop oral candidiasis<sup>2</sup>. But when the systemic predisposing factors (i.e, dehydration, fatigue, chronic disorders) are present, the chronic atrophic type of denture stomatitis will sometimes develop into the acute pseudomembraneous stage. The clinical sign of this stage is characteristically severe pain so that the patient cannot take foods wearing his own denture. Therefore, rapid diagnosing and appropriate treatment by dental practitioners are needed. The clinical signs and identification of *Candida* species from the lesion are the most important criteria in diagnosing oral candidiasis. Since *Candida* species occur as commensal microorganisms in the oral cavity in 20% to 60% of healthy people<sup>6,8</sup>, the major factor leading to a diagnosis of oral candidiasis is the cell numbers of *Candida* species isolated from the lesion. It is believed that the levels of *Candida* species must be 10<sup>4</sup> CFU/ml and greater<sup>15</sup>.

Therefore, this new liquid medium (STOMASTAT) will be ideal because it is designed to change color from red to yellow with cell numbers of 10<sup>4</sup> CFU/ml and greater.

In acute pseudomembraneous candidiasis, the patient cannot take foods and dehydration often occurs. This vicious cycle is the most important cause of increase in the growth of *Candida* species. In order to improve the patient's physical condition, infusion therapy will be the first choice of treatment. At the same time, a local approach to the treatment should be used in combination. In antifungal ointment, Nystatin (100,000 units/g) or 1% Miconazole nitrate are very safe and effective in the case of oral candidiasis<sup>17</sup>. These ointments should be applied

to the fitting surface of denture on which a large number of *Candida* cells are found rather than on the denture-bearing mucosal surface<sup>14,16</sup>.

By leaving the denture out during the night and using an antifungal solution such as 0.5% Hibitane, oral hygiene will be improved and the inflammatory change of oral mucosa will resolve more rapidly<sup>1,3</sup>. Therefore, we should advise the patients to keep their dentures clean and not to wear them at night. As has been pointed out in this disease, denture plaque control is the most significant factor in the prognosis of the treatment.

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