**Materials and Methods**

From January 2010 to December 2012, 297 cytological examinations were conducted in patients with thyroid tumors (n=200), cervical lymph node (n=75) and salivary tumors (n=22) in this study at Fujinomiya City General Hospital. Two samples were obtained for each lesion. Fine needle biopsies were performed in each lesion with 23-gauge needles accompanied with the ultrasonic device (Figure 1). The fine needle is introduced into the tumor with one hand and moved back and forth very slightly while it is angled in different directions and at different depths within the tumor before it is withdrawn in FNNA. FNNA technique reduces the amount of blood in the samples, particularly for thyroid tumors. In addition, the direct contact with the needle allows a more sensitive finger tip feeling of the consistency of the tumor tissue during sampling. That leads to the insufficient specimens and the cause of less inadequacy rates. On the other hand, the inadequate samplings without aspiration was mostly due to blood contamination (Figure 3). The material from FNNA is usually as abundant in cells as that extracted with FNA. The inadequacy rate was higher for thyroid tumor with FNA and the inadequate samplings obtained with aspiration were mostly due to blood contamination (Figure 3). On the other hand, the inadequate samplings without aspiration was mostly due to absence of cellular material (Figure 4). No statistically significant difference was noted in the diagnostic yield between the two techniques.

**Results**

Overall, specimens from 21 patients (7.1%) of 297 were inadequate with both techniques together. Forty-three (14.5%) were insufficient specimens with FNA alone and 33 (11%) with FNNA alone. Insufficient specimens were obtained at 30 (15%) and 21 (10.5%) of 200 thyroid tumors, and 20 (10.5%) and 1 (4.5%) of 22 salivary tumors with and without aspiration, respectively. The inadequacy rates were same (14.7%) in the lymph nodes with each technique (Table 1). Figure 2 shows the specimens from the two sampling techniques.

**Discussion**

FNA sometimes causes the trauma of the tumoral and surrounding tissues and the amount of blood in the samples, particularly from vascular lesion. That leads to the insufficient specimens and the cause of increase of the inadequacy rates. We believe that FNA produces a comparable cellular yield, and has a similar diagnostic accuracy to FNNA in the head and neck tumors. Also, that the technique permits a significant reduction in trauma to the tissues, and that it reduces the amount of blood in the samples. In our study, the insufficient material obtained with FNNA from thyroid tumors was less than that with FNA. The cause of insufficient material with FNA was mostly due to blood contamination. FNNA technique reduces the amount of blood in the samples, particularly for thyroid tumors. In addition, the direct contact with the needle allows a more sensitive finger tip feeling of the consistency of the tumor tissue during sampling. That contributes the less inadequacy rates. On the other hand, the inadequate samplings with FNNA was mostly due to absence of cellular material. So, we conclude that the present study has shown that adding aspiration to the single-needle technique reduces inadequate samplings from the head and neck tumors. This study also has confirmed that most inadequate results are ruled out by double sampling, which might thus suggested as a standard policy.

**Conclusions**

1. FNNA produces a comparable cellular yield, and has a similar diagnostic accuracy to FNA in the head and neck tumors
2. FNNA technique reduces the amount of blood in the samples, particularly for thyroid tumors. That contributes the less inadequacy rates
3. The inadequate samplings with FNNA was mostly due to absence of cellular material
4. We concluded that FNNA is equal to FNA in the cytological studies in the head and neck tumors. Double sampling may reduce inadequacy rates to low levels and be useful as a routine policy.