FLUORESCENCE CYSTOSCOPE ASSEMBLY

A Unit Newly Designed for Biopsy on the Bladder Mucosa

BY

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ABSTRACT

The authors have newly devised a fluorescence cystoscope assembly. This fluorescence assembly is able to 1) confirm lesions in the bladder mucosa by fluorescence, 2) mark and cut the lesions with accuracy for histological survey. Moreover, this assembly is characterized by its exactness in cutting out the appropriate amount of specimen (bladder mucosa) and by its convenience in performing biopsy especially around the bladder neck.

INTRODUCTION

It has been difficult to establish a definite view on fluorescence regarding the morbid changes (in particular tumors) of the bladder. Inflammatory lesions sometimes show fluorescence (Mitani11) and bladder mucosa bearing tumors do not necessarily show fluorescence (Melamed, et al.9, etc.). Thus it has been felt that the validity for clinical diagnosis is rather limited.

It might be of importance to study the fluorescence of bladder mucosa in which there appears no tumor.

METHOD

We have devised a new kind of fluorescence cystoscope assembly which is able to cut the fluorescence lesion with high accuracy (Fig. 1, 2).*5

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*5 A fluorescence cystoscope assembly registered by Shinko Optical Instrument Co., Ltd., Tokyo.

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The ultraviolet light generator used is coupled to a power source (Fig. 2)*6. It has the following mechanism:

The rays emitted from a high voltage mercury lamp of 250 W are selectively transmitted through the primary filter resulting in the excitation rays of 4040 to 4360 Å.

The excitation rays are passed through a light guide and projected upon the bladder wall. The projected rays go back through the optical system to reach the secondary filter. The secondary filter shuts out its own fluorescent rays under 4900 Å and transmits only the secondary fluorescent rays. For this reason, the wave lengths of the fluorescent rays, we observe, range from 4900 to 7500 Å, which include the four colors, green, yellow, orange and red.

The cystoscope has a special mechanism (Fig. 3, upper). A piercing needle is mounted on the top and it is designed to be extended to an appropriate length and direction. This enables it to pierce the desired spot of the bladder mucosa, marking exactly the bleeding spot (Fig. 5, 6), which in turn enables it to confirm the exact lesion in millimeters for cutting by the forceps (Fig. 3, 4, upper) specially designed for this purpose.

A characteristic mechanism of the forceps is as follows: The forceps have rather shorter cutting edges being 4 cm in length. The curved edges of the top are narrower at the tip while the conventional ones are wider. These cutting edges are attached to the cystoscope body at a sharper angle (Fig. 4). These factors make the field of view favorably enlarged and this gives good orientation in detecting the lesion and makes it easy to perform a biopsy, particularly on the bladder neck and its surrounding area whereas the conventional forceps have been limited in its use.

**DISCUSSION**

The diagnostic significance of the endoscopy fluorescence reaction of bladder tumors appears not settled. An understanding of the potential malignancy from the fluorescence as well as from the histopathological point of view is of interest.

In view of this, study of the surrounding mucosa of the tumor as well as the tumor itself appears necessary, e.g. studying the correlation between the

*6 The power source used for this unit is manufactured by the Ushio Electric Co., Ltd. Tokyo.

Fig. 1. (a) A fluorescence cystoscope re-designed for a bladder biopsy. See also Fig. 3 (upper).
(b) A biopsy forceps re-designed for cutting the bladder mucosa. See also Fig. 3 (lower).

Fig. 2. Ultraviolet light generator coupled to a power source.
Fig. 1.

Fig. 2.
Fig. 3. Top of a fluorescence cystoscope with a newly designed piercing needle (upper) and forceps (lower).

Fig. 4. Cutting edges of the re-designed forceps (upper), compared with the conventional ones (lower) characterized by 1) shorter cutting edges 2) narrower points at the tip 3) the cutting edges being attached to the cystoscope body at a sharper angle.
Fig. 5. The bladder mucosa pierced with a needle.

Fig. 6. Petechia on the bladder mucosa resulting from the piercing.
small lesions with a positive fluorescence (chronic inflammation and premalignant and malignant lesions, etc.) and the histological findings could be of importance (Mitani1).

The newly devised fluorescence cystoscope which is capable of controlling a needle would be useful in marking the delicate small lesions to be biopsied. The forceps would be helpful in cutting around the neck of the bladder with high accuracy and in obtaining just the appropriate amount of specimen.

Obtaining an excessive amount of specimen, for the histological diagnosis is troublesome in making serial sectioning.

References
