53. Radiography for the Gastric Anterior Wall Using Gyroscope

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It is extremely difficult to show the findings of the anterior wall of the stomach precisely in the conventional radiographic examination. We have established the methods for this purpose by means of a new X-ray apparatus, Gyroscope. As its technique is easy, it is useful for the routine examination of the stomach. We intend to report these methods with presentation of some clinical cases.

Methods. As an X-ray apparatus, Gyroscope was used (Fig. 1). This apparatus has several characteristic functions, such as "whole rotation, table rotation, beam rotation", etc. Besides, to perform these functions, a patient must be fixed on a table-top. For this purpose, the special fastening band was designed. A part of the band is shown in Fig. 1. Moreover, as a patient is supported by the band, he can be tilted backward up to a perfect upside-down position.

Methods mentioned below are all double contrast radiography and the volume of barium meal and air per one patient is about 200–250 ml and 250–350 ml respectively.

Method I. Prone and upside-down method. When a patient is tilted from a prone position to a upside-down position, barium meal which had covered the gastric anterior wall moves to the fornix, and so the double contrast picture of the gastric anterior walls is shown (Fig. 2). (Notes: Using this apparatus, a patient is hung down from a table-top in a prone position by the fastening band.)

Method II. Prone and rotary method. When a patient is turned from the prone position mentioned above to a left (or right) recumbent position by "whole rotation", barium meal which had covered the gastric anterior wall moves to the greater curvature side of gastric corpus (or to the antrum and lesser curvature side of corpus), and so the gastric anterior wall is shown by a postero-anterior projection as a double contrast picture (Fig. 3 and 4).

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Method III. *Prone, compression and rotary method.* This method is itemized in order.

1) A patient is laid down on the table-top in a prone position and he is bound by the fastening band. At this time, let him grip both rings of the band by his both hands to fix his arms and hands (Fig. 5).

2) He is pressed slightly from the back by the spot-shot device. In this state, the stomach is pressed from both front and back, so the curved surface of anterior wall like a bottom of ship becomes flatter.

3) When he is turned from the prone position to a left (or right) recumbent position by “whole rotation”, barium meal which had covered the anterior wall moves to the greater curvature side of gastric corpus (or to the antrum and lesser curvature side of
corpus), and so the gastric anterior wall can be shown as a double contrast picture with compression by an antero-posterior projection. When a upside-down position is taken slightly during the examination, the region of anterior wall will be demonstrated more extensively (Fig. 6).

Clinical cases. The application of these methods will be demonstrated in the following cases.

Case 1. 49 years old woman. Advanced stomach cancer. It was shown in Fig. 7 taken by method I (the following is shorten like Fig. 7(M-I)). A surgical operation was tried for this case, but it resulted in tentative laparotomy.

Case 2. 72 years old man. Early stomach cancer. It was shown in Fig.8(M-II). The prominence illustrated in the picture was also demonstrated endoscopically at the anterior wall, and it was removed surgically.

Case 3. 72 years old woman. Gastric polyps. Both polyps were shown in Fig. 9(M-III) and demonstrated endoscopically at the anterior wall.

Case 4. 40 years old woman. Duodenal ulcer and suspicion of early stomach cancer. A longitudinal prominence parallel to both curvatures is seen in Fig. 10(M-III) and it was demonstrated endoscopically too.

Case 5. 58 years old man. Ulcer scar. Mucosal folds at the anterior wall of the corpus were demonstrated clearly in Fig. 11(M-III). The scar indicated with an arrow was demonstrated endo-

Fig. 7
Fig. 8
Fig. 7. Picture of advanced stomach cancer demonstrated by method I at the anterior wall.
Fig. 8. Picture of early stomach cancer demonstrated by method III at the anterior wall of the angulus.
Fig. 9. Picture of gastric polyps demonstrated by method III at the anterior wall (arrows).

Fig. 10. Picture of duodenal ulcer and a prominence (arrow). This picture was taken by method III.

Fig. 11. Picture of ulcer scar demonstrated by method III at the anterior wall (arrow).

Table I. Demonstrability of folds

<table>
<thead>
<tr>
<th>Methods</th>
<th>Method II</th>
<th>Method III</th>
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<tbody>
<tr>
<td>Cases</td>
<td>574</td>
<td>731</td>
</tr>
<tr>
<td>Grade</td>
<td>+ +</td>
<td>+</td>
</tr>
<tr>
<td>Cases</td>
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<td>157</td>
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<tr>
<td>%</td>
<td>30.0</td>
<td>70.0</td>
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</tbody>
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+++, excellent; +, good; ±, not good; −, not shown.
scopically at the anterior wall too.

**Comments.** By means of conventional X-ray method, a small amount of barium meal is used for the examination of gastric anterior wall, and so hatching usually appears in the radiogram of stomach. When Gyroscope is used for this purpose, however, a large amount of barium meal can be taken, and so the hatching never appears in above-mentioned methods. The techniques of the methods are simple, and method III is better than both methods I and II in the way of flattening the curved surface of gastric anterior wall. Comparison between method II and III is shown in Table I. Method III is better than method II in the demonstrability of folds, but the pictures become less clear because of antero-posterior projection.

**Summary.** Up to the present, it was difficult to take the double contrast picture of the gastric anterior wall with compression by routine method with conventional apparatus. However, we established the superiority of new radiographic techniques for the gastric anterior wall utilizing Gyroscope, and reported the methods with presentation of some clinical cases.

Especially, method III is excellent in the demonstrability of mucosal pattern and it is valuable for the double contrast radiography of gastric anterior wall.

**References**
