A New Method of Aimed Bronchography*

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During bronchoscopic examinations, openings are often observed in the bronchial wall. Besides the normal orifices, these openings are of various origins. They are mostly suspected to be tuberculous fistulae or perforations of tuberculous lymph nodes. Due to the fact that because only a small part of tuberculous lymph nodes perforates the mucous membrane or comes into contact with the bronchial wall, it is important to explore their bronchoscopically invisible details. As in our Case 4 described below, the bronchial lumen is occasionally stenosed to the size of these anomalous openings. For this reason we were prompted to find a method for the demonstration of the origin and tract of these bronchoscopically unidentified orifices. Bronchography did not seem to be suitable in such cases, for the contrast substance which fills the whole lung does not penetrate into these small openings. The Metras catheter used in aimed bronchography is too large and too soft; thus, it could not be considered for our purposes. For this reason, we tried to introduce under optical control a thin rigid metal or ureteral catheter into these openings and to pass the thin contrast fluid through the catheter. Our instrument was the so-called diathermic optic of Lemoine's bronchoscope. Through the tube serving to guide the diathermic loop of this optic, we inserted a ureteral catheter or a 45 cm. long metal catheter devised for this purpose into the opening (Fig. 1) Kassay has used a metal catheter to inject the contrast material, but without optical control.

Beside appropriate roentgenograms, it is necessary to perform bronchography of the whole side in question so as to clarify the relationship of the opening to the bronchial system. Our experience has shown that

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Figure 1: Ureteral catheter inserted into the diathermic optic of Lemoine's bronchoscope.
after which her fever ceased, but subfebrility remained for a longer period. After having been subfebrile for two months, she came for radiologic examination which revealed pneumonia in the cardiophrenic angle, localized by tomography in the 10th segment. A pinhead-sized irregular-shaped orifice could be seen during bronchoscopy between the orifice of the seventh segmental bronchus and the basal terminal ramification. A 3 x 3 cm.-sized, irregular-shaped defect could be filled through the orifice (Fig. 3). The picture corresponds neither to an excavated lymph node nor to a bronchogenic cyst. As regression of the picture did not occur, resection of the right lower lobe was performed. Pathologic examination revealed a pneumatocele (Dr. Vincze).

Case 3

Is a 48-year-old man, presently on treatment in our hospital. His history included measles, Varicella and gastric resection. The tuberculous process began in 1951 with bilateral apical hematogenous dissemination. He had drug therapy in 1951 and 1953 for a few weeks and worked without interruption till 1956 when hemoptysis occurred with fever and excessive cough. He continued working. In October, 1959 a screening procedure prompted him to begin ambulatory PAS and isoniazid treatment, and in July, 1960, he was admitted to our institution. Tomographies did not reveal cavitary changes and bacterial cultures were negative. His general

Figure 2: Latero-lateral roentgenogram. In the center of the hilum an excavated lymph node is visible filled with radiopaque substance.

the differentiation of the fistulae and the bronchi is facilitated when bronchography and fistulography are not performed simultaneously.

The following examples illustrate our results:

Case 1

A 21-year-old mine worker came to our institution after having been previously treated for one and one-half years for pulmonary tuberculosis. On admission tubercle bacilli and a cavity 4 cm. in diameter in the right lower lobe were found. Bronchoscopically, a 3 mm. opening was visible on the medial wall of the right stem bronchus. Signs indicating tuberculosis were absent in the vicinity of the opening. Bronchography of the right lung previous to resection showed that the contrast material did not penetrate the fistula. For this reason, bronchoscopy was repeated. On this occasion the contrast fluid was injected into the fistula through a metal catheter. The contrast fluid filled the cavity the size of one-half of a walnut to a distance of 2.5 to 3 cm. from its mucosal orifice. Thus it was identified as an excavated lymph node. The surgical specimen proved this diagnosis to be correct. (Fig. 2.)

Case 2

A 38-year-old woman who had pneumonia for three weeks was given oxytetracycline therapy
condition was good and laboratory findings were negative. On bronchoscopy, on the left side above the basal ramification and below the sixth segmental bronchi, a duct of 1 mm. diameter was visible on the medial bronchial wall. Its orifice was well delineated and the surrounding mucosa slightly inflamed. The duct discharged secretion. Contrast material was injected and the radiologic examination was continued (Dr. Róka, Fig. 4). Roentgenograms showed the duct to end in a spheric hole with a diameter of 10 to 12 mm. This picture was interpreted as an excavated lymph node. The filled cavity was visible for more than a week, so total unilateral bronchography was performed. The duct of the cavity was a rudimentary basal medial ramification of the bronchial tree which could be followed distal to the cavity and the cavity was peribronchial in position (Fig. 5, 6). Beside the diagnosis of excavated lymph node, the possibility arose of a peribronchial tuberculoma described by Kurucz. We administered thiosemicarbazone suspension locally.

CASE 4

A 29-year-old home worker had disease for one year. First manifestations were pneumonia with fever and a great amount of sputum. Cough and expectoration did not decrease when fever subsided. When admitted to the hospital, tomography revealed obstructive emphysema of the lower lobe. On bronchoscopy, the bronchus intermedius was found to be grossly stenosed with lumen scarcely one mm. in diameter. Bronchog-
The significance of the four cases presented consists of the fact that our method of aimed bronchography revealed pathologic alterations which were not detectable by the previous clinical and radiologic investigations.

**Conclusions**

1. Bronchoscopy is necessary but not sufficient in the diagnosis of small orifices of the bronchial system.

2. Standard bronchography procedures, such as total unilateral filling with contrast substances or aimed bronchography through Metras catheter are also inadequate methods for the diagnostic exploration of small orifices of the bronchial system.

3. Shape and direction of these tracts can only be made visible when filled through a catheter inserted into the orifice under optical control.

4. Our procedure helped to establish such rare diagnoses as excavated lymph node, peribronchial tuberculoma and pneumatocele.

5. The method described enables the aimed local administration of drugs into the explored pathologic area.

**Conclusiones**

1. La broncoscopia es necesaria pero no suficiente para el diagnóstico de los pequeños orificios en el sistema bronquial.

2. El procedimiento de broncografía estándar, como el llenado unilateral completo con sustancias de contraste o la broncografía encaminada o dirigida por medio de un catéter de Metras, son también métodos impropios para el diagnóstico de exploración de pequeños orificios del sistema bronquial.

3. La forma y dirección de estos ductos puede ser hecha visible solamente cuando se llenan por medio de un catéter insertado en los orificios, bajo control óptico.

4. Nuestro procedimiento ayudó a establecer diagnósticos raros, tales como ganglio excavado linfático, tuberculoma peribronquial y pneumatocele.

5. El método descrito permite la administración bien apuntada de drogas dentro del área patológica que se explora.
RESUMÉ

1. La bronchoscopie est nécessaire mais n’est pas suffisante pour préciser l’état des petits orifices du système bronchique.

2. Les moyens habituels de bronchographie, tels que l’emplissage avec des substances de contraste ou la bronchographie dirigée à travers une sonde de Métas sont également des méthodes impropre pour l’exploration des petits orifices du système bronchique.

3. La forme et la direction de ces conduits ne peuvent être rendus visibles que lorsqu’ils sont emplis à travers une sonde introduite dans l’orifice sous contrôle optique.

4. Le procédé utilisé par l’auteur a permis d’établir des diagnostics très délicats tels que celui de nodule excavé, de tuberculose péribronchique et de pneumatocele.

5. La méthode décrite permet l’administration locale dirigée de produits dans la zone pathologique explorée.

ZUSAMMENFASSUNG

1. Die Bronchoskopie ist notwendig aber nicht ausreichend bei der Diagnose für die kleinkalibrigen Orificien des Bronchialsystems.

2. Die Standardmässigen bronchographischen Methoden wie die totale einseitige Füllung mit Kontrastmitteln oder die gezielte Bronchographie durch Metras-Katheter, sind ebenfalls untauglich für die diagnostische Untersuchung der kleinen Orificien des Bronchialsystems.

3. Aussere Form und Richtung dieser Bronchialabschnitte können nur sichtbar gemacht werden, wenn sie durch einen Katheter gefühlt werden, der unter Leitung des Auges in das Orificium eingeführt wird.

4. Unsere Methode trug zur Ermittlung solch seltener Diagnosen wie Lymphknopenkaverne, peribronchiale Tuberkulose und Pneumatocele bei.

5. Die beschriebene Methode ermöglicht die gezielte lokale Anwendung von Medikamenten in dem untersuchten pathologischen Bereich.

REFERENCES


KRYPTON™ INHALATION TEST FOR CARDIAC SHUNTS

The results of inhaled Krypton tests, carried out in 333 patients in whom the diagnosis was firmly established, were analyzed. Blood samples were drawn while the patients inhaled a Krypton and air mixture and the results of the test were expressed as the ratio of the radioactivity in blood obtained from the right side of the heart to that obtained from a systemic artery. In the 161 patients subsequently proved to have left-to-right shunts, the results of the test ranged from 13 to 113 per cent. In the 163 patients without cardiac shunts, the results ranged from 0 to 12.2 per cent. The Krypton test may thus be employed with confidence for determining the presence or absence of a left-to-right shunt. In addition, when the test is successively performed in the pulmonary artery, right ventricle and right atrium, the site of entry of the shunt into the right side of the heart may be correctly localized.