Recent Advances in the Conservative Treatment of the Giant Cavity*

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A giant cavity is a huge excavation which involves the greater part of a lobe or a whole lobe. When it occupies more than one lobe, we do not speak of giant cavity but of lung emptying, "vaciamiento pulmonar."

There are two types of giant cavities; and their differentiation is important since the treatment varies with the type. The first is the inflated, hypertensive giant cavity with a check-valve mechanism whose volume depends on the function of this valve. The second is the giant cavity following the progressive destruction of the surrounding tissue. The inflated cavity is not necessarily surrounded by infected lung tissue but can develop in almost healthy tissue, while the destructive cavity is necessarily surrounded by diseased tissue subjected to a more or less rapid process of destruction. While the differentiation between an inflated and a destructive cavity is sometimes easy, it is frequently difficult.

Radiologically, we can say that a cavity is valvular when it appears in tissue little affected by condensation and/or caseation. The volume quickly surpasses that of the initial lesion; its contour is spherical or oval with thin walls. The destructive cavity is also round until it reaches a certain size when it loses this characteristic and is molded by the thoracic wall, the fibrous tissue formation or other hard surrounding tissues. This type of cavity is surrounded by densely condensed tissue, partly diseased and partly compressed, which casts a heavy shadow. Usually this cavity has a slow progress, or it may progress rapidly in caseopneumonic process. It is seldom isolated and seldom corresponds to unilateral disease. On the contrary bilateral involvement is the rule.

Clinical observations offer different data:

The inflated cavity is usually silent. The destructive cavity, surrounded by solid conductive tissue gives the typical cavity syndrome, with expiratory cavernous breathing, coarse rales associated with sibilant rales. However, sibilant rales may occasionally be found in inflated cavities.

Radiologically we may observe the expansion of the cavity under

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cough strain, with a slow return to its original size. This phenomenon is not easily or frequently visualized.

In both types, the sputum is usually positive but in the destructive type the number of bacilli is greater for obvious reasons.

The technique that we wish to present concerns the treatment...
of these two types of cavities which constitute one of the greatest
difficulties encountered by the thoracic surgeon. These cavities
react to pneumothorax in an inconstant and unpredictable manner.
Intrapleural pneumothorax is sometimes attempted in spite of
the slight chances of success. These attempts are justified by a

**FIGURE 3.** G.M.: The col-

**FIGURE 4.** G.M.: Conversion

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rare favorable outcome, provided the phthisiologist will opportune
discontinue an inefficient or incomplete pneumothorax. An attempt
at pneumothorax is also justified for ascertaining whether the
pleura is free, even though it has been decided not to carry out
a gaseous collapse. A free pleural space will modify the technique
that must be followed.

FIGURE 5, E.S.: Giant cavity
in the right upper lobe and
another smaller one underneath.
Intrapleural pneumothorax was
continued for several years on
that side but was abandoned
14 years ago. A large nodule is
visible under the left clavicle.
Sputum: Tubercle bacilli very
numerous.

FIGURE 6, E.S.: To avoid
thoracoplasty and deformity,
the combination thoracoplasty-
extrapleural pneumothorax was
performed with excellent results.
The upper lobe seems to be
collapsed and the cavity closed
and protected from perforation
by the soft tissues left on the
surface of the lobe.
Before any therapeutic decision is carried out, the bronchial patency must be determined by means of needling the cavity. This puncture will indicate if the cavity is hyper- or hypotensive, and thus, if the bronchus is constantly open or not. The changes in intracavitary pressure may be observed after coughing as air enters the bronchus and the time necessary for its return to the

**FIGURE 7, E.S.:** Conversion to oleothorax with 1000 cc. Nujol when the chamber was filled up.

**FIGURE 8, E.M.:** Giant cavity in the right upper lobe and exudative spread over the lower lobe and the opposite lower lobe. Sputum: very large number of tubercle bacilli.
initial pressure is noted. This procedure should be carried out only when pleural synechia is present at least within the area of the thoracocentesis.

Besides intrapleural pneumothorax which is frequently inefficient in the treatment of these cavities, we have other conservative and radical recourses. The conservative methods are Monaldi's
intracavitary aspiration, extrapleural pneumothorax, and other nondeforming extrapleural operations. The radical procedures are: extensive thoracoplasty and pulmonary resection.

Thoracoplasty and resection are both disfiguring because pneumonectomy and lobectomy in tuberculosis must be followed by thoracoplasty. Especially in lesions that are rarely unilateral, thoracoplasty before or after pulmonary resection must be carried out if we do not wish to provoke flare-ups in the remaining lung.

We advocate the treatment of giant cavities by conservative methods for several reasons:

1) Usually the patients are young and their future is affected by great disfigurements such as that caused by an extensive thoracoplasty as must be done in these cases.

2) The most extensive thoracoplasty may fail to collapse a giant cavity and may only result in an incomplete closure.

3) Pulmonary resection has a greater operative risk in bilateral cases.

Extrapleural methods are preferable to those like the Monaldi method because we consider that eventually, as in most cases of giant cavity, these methods lead to a complementary thoracoplasty. However, we admit that in some expert hands the Monaldi intervention is efficient in an unexpected manner.

With reference to extrapleural pneumothorax, we have already published several works which try to justify the use of this method by presenting examples of the good results. It is particularly indicated in the inflated cavity where there is a thick layer of healthy tissue between the cavity and the thoracic wall allowing a separation far from the cavity.

We do not recommend extrapleural pneumothorax for cavities of the destructive type so huge that they seem to be limited in size by the thoracic wall, because of the great risk of provoking an early or late perforation with subsequent empyema. This type of cavity contraindicates conventional extrapleural pneumothorax. That is why our efforts have been directed towards evolving a technique which will avoid the aforementioned disadvantages but offer reasonable hopes for the closure of the cavity.

The standard extrapleural thoracoplasty with a more or less extensive rib resection but without apicolysis does not solve the problem in the majority of cases. Semb's thoracoplasty more frequently solves this problem though not always, and leaves great disfigurements because of the extensive resections needed in two or three stages. Sometimes, after all these steps, we find that the cavity has not closed but eludes collapse by just descending and decreasing in size. Then secondary pneumonectomy is justified.

However, both thoracoplasty and this latter operation deform
the thorax and we do not believe this is justified if there is a conservative method which, without deformity, and in one or two stages, will accomplish the same or even better results than an extensive thoracoplasty.

In order to avoid the disadvantages of extrapleural pneumothorax and thoracoplasty, we have combined the two operations with the following advantages:

**FIGURE 11, A.M.:** Large apical cavity on the upper lobe. Pleural synechia.

**FIGURE 12, A.M.:** The combination thoracoplasty - extrapleural pneumothorax was done.
a) A collapse equally extensive or more so than that obtained by thoracoplasty.
b) There is no appreciable disfigurement even in the naked thorax.
c) The lung is protected, so that this type of cavity is not liable to rupture as in the usual extrapleural pneumothorax.
d) It is a permanent procedure like thoracoplasty.

**Technique for Extrapleural Pneumo-Oleothorax Combined with Apical Thoracoplasty**

This is a preliminary report of our treatment of giant cavities by this technique. To-date our results have been very satisfactory.

The operation is carried out with endotracheal ether-cyclopropane anesthesia, with frequent aspirations. The incision is the usual for a thoracoplasty, that is, the paravertebral incision including skin and muscles. The first steps of the procedure are performed like a three rib thoracoplasty, resecting almost all of the third rib and all of the first and second ribs in the order mentioned. This resection is intraperiosteal, the perlosteum is left "in situ." We wish to emphasize that in this operation it is not necessary to resect the transverse process or to disarticulate the ribs.

From this step forward the operation is carried out as in Semb's thoracoplasty, differing from this author's technique in a few details that are important: first, we try to conserve all the soft tissue.
tissues that cover the lung anteriorly, laterally and posteriorly, so that we maintain the adhesion of the periosteum, intercostal muscles, blood vessels and nerves to the parietal pleura. It is through this adhesion that we try to protect the cavity wall.

Then the lung is separated by blunt dissection on its mediastinal aspect down to the hilum, with extreme care because of the danger of injuring blood vessels, nerves, lymph nodes and the thoracic duct. Then the muscles, intercostal vessels and nerves are cut after ligature; the section is done as far anteriorly as possible as well as posteriorly. Thus the lung stump falls vertically and a first stage of Semb's thoracoplasty has been carried out with slight variations, but now instead of limiting ourselves to the separation and descent of the apex, we also make an extrapleural decollation as low as is anatomically possible, leaving a subtotal extrapleural space. Sometimes we leave a drainage at the lowest point, depending on the hemorrhage, and suture in two layers.

The operation is well tolerated and we attribute this to the anti-shock treatment of the present day, including generous transfusions. Twenty-four hours later we withdraw the drainage tube and occlude the course of it. The extrapleural pneumothorax is maintained in the usual manner and approximately one month later we convert it to oleothorax.

The examples presented show that a greater collapse is obtained than in thoracoplasty or even in Semb's operation. We have found, in our limited experience, that the soft tissues protect the cavity from perforation and our experience for over 10 years with mineral oil in extrapleural pneumothorax has shown us it is well tolerated.

The aim of this procedure is to obtain a permanent collapse in one operation. Sometimes we reoperate if the collapse is insufficient. This brings no further disadvantages since there is no disfigurement of the thorax. This operation must not be confused with similar procedures in which costal resection is carried out including the periosteum and intercostal vessels, since, on the contrary, owing to the sparing of these tissues we have obtained satisfactory results.

RESUMEN

Las cavernas gigantes pueden dividirse en dos grupos, las infladas con poca destrucción tisular y las destructivas con pérdida de tejido muy considerable, limitándose a veces aparentemente por la pared torácica.

Estas cavernas son difíciles de ocluir por los recursos de colapso habituales y cuando se logra es a costa de grandes deformaciones que afectan el futuro de los sujetos jóvenes.
La toracoplastia sea desde luego o después de neumonectomía es la intervención obligada.

A fin de evitar las operaciones deformantes el autor presenta una técnica quirúrgica consistente en una combinación de toracoplastia apical de tres costillas a la manera de Semb con modificaciones pequeñas, con un neumotórax extrapleural desde la cuarta costilla hasta el surco costo diafragmático. Toda la operación se realiza en un tiempo o en dos cuando más.

Después de un mes el extrapleural combinado se convierte en oleotórax con el fin de obtener un colapso permanente.

El aceite mineral es bien tolerado según su experiencia en oleo extrapleural que sobrepasa diez años.

Las ventajas que presenta el procedimiento son las siguientes:

a) Realiza un colapso tan extenso o más que el de una gran toracoplastía.

b) No ocasiona deformación del tórax en forma apreciable ni aun en el tórax desnudo.

c) No expone a perforación de la caernea y emplema consecutivo como el extrapleural corriente si se aplica a caernea gigante.

d) Es un método permanente como la toracoplastía.

e) Puede habitualmente realizarse en un tiempo.

Presenta algunos ejemplos de esta técnica.