

## A NEW AND PRACTICAL VISCEROTOME \*

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*An instrument consisting of a sheath-like tube 22 1/2 cm. long with a rod or trocar and attached cutting blade is described. It may be used to obtain fragments of non hollow organs, 7mm wide by five to ten centimeters long, to substitute the classic viscerotome.*

*No failures have occurred in viscerotomies of the liver so far.*

*The greatest advantage of this instrument is its relatively small size. Its more practical use is to overcome the difficulties which may hamper the use of the classical viscerotome.*

*This is very important as the need arose to reorganize the network of viscerotomy service. In some areas or countries where no complete autopsies can be performed, biopsy samples have been reduced to such a small size that no practical information has been received in the last few years.*

*The difficulties of performing an autopsy prevents the obtention of useful pathological data on several diseases affecting the population, even among patients dying in hospitals. The viscerotomy is also the practical solution for this problem.*

In 1930, the Brazilian Health Service was taking drastic steps to obtain prompt reports of sporadic outbreaks and isolated cases of yellow fever in the silent areas. The difficulty of autopsies to be performed in places where physicians were not available was first overcome by partial autopsies and thereafter the first organization for securing liver specimens through partial autopsies was created by the Public Health Service of the State of Rio de Janeiro, in Niteroi, across the Guanabara Bay. One of the advantages of the method

was that even a layman could be in charge of the process of obtaining the specimen.

Prof. A. Lintz (1), then Chief of the State of Rio de Janeiro Public Health Service, ordered the adoption of the method for all fatal cases of diseases with fever of less than eight days duration and without clinical diagnosis before death. The original idea of using the method of partial autopsy by a layman was put into practice by Professor D. Parreiras (2), at the time acting as the Director of the Yellow Fever Control Service in the State

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of Rio de Janeiro. Almost simultaneously the same procedure was introduced by The Cooperative Yellow Fever Service, administered by the Rockefeller Foundation in Belem in the State of Pará and in the State of Rio Grande do Norte. Soper (3) states that the two organizations started the practice of partial autopsies, as imagined by Parreiras, almost simultaneously but that Parreiras' work was in operation about three months before that of the Rockefeller Foundation.

Soon afterwards the Health Services' officers interested in the control of yellow fever started to work on the invention of a practical instrument for obtaining liver sections without opening the chest or the abdominal wall. Such an instrument was invented independently by Prof. Parreiras (2, 4) and Dr. E. R. Rickard (5) of the Rockefeller Foundation working in the Yellow Fever Service in the State of Pernambuco. The type of instrument developed by Dr. Rickard to which the name of "viscerotome" was given, proved to be the most suitable and as early as 1931, several towns in the interior of that state were provided with the "viscerotome" and several liver specimens were obtained from those areas.

It must be pointed out that as early as 1928, Dr. Connor made the first proposal for systematic autopsies aimed at the diagnosis of yellow fever in Sergipe. It was not until August 17, 1930, that an official recommendation regarding the performance of autopsies in suspected cases was made by Prof. Fraga (6) then Director General of the Department of Public Health of Brazil. Before that date, August 1930, nevertheless, the procedure of partial autopsy was already introduced in the State of Rio de Janeiro, but the federal decree which forced the practice of systematic viscerotomy and of necropsies, when considered necessary, went into effect only on the 23rd of May, 1932 (4).

The Viscerotomy Service in Brazil quickly reached nation wide proportions and as many as 480,000 liver specimens have been obtained from all over the country since its implementation.

Colombia, Venezuela and several other American and African countries tried to introduce this method with a variable degree of success. The value of the method

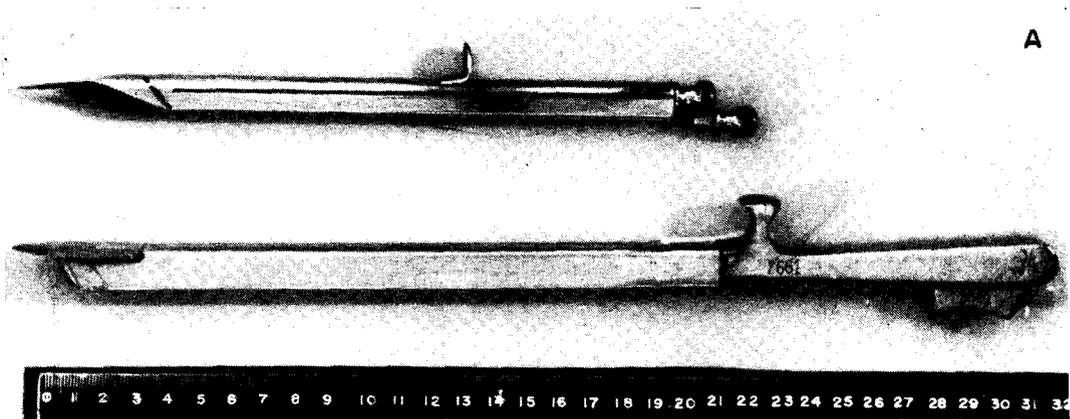
has always been demonstrated where either domestic yellow fever was still active or where the sylvatic form of the disease appeared.

The main objection to the use of viscerotomy in Africa usually arose among the natives on religious grounds. In Brazil some objection derived mostly from the fact that the classic instrument, a type of large trocar (Fig. 1-A) more than one centimeter square and 34 cm. long with a sliding blade on one side, had the appearance of an ancient inquisitorial instrument. Nevertheless, when properly used, even in the hands of non medical personnel, it usually provided a strip of tissue about one centimeter square and five or six centimeters long.

Rickard's viscerotome, used by the National Yellow Fever Service, was credited for the identification of thousands of cases of sylvatic yellow fever in Brazil. The histopathological examination was first carried out by the Yellow Fever Laboratory (Rockefeller Foundation — Brazilian Government) and later by its successor, the Laboratory of Viscerotomy of the Oswaldo Cruz Institute, Federal Ministry of Health, in Rio de Janeiro. Much other useful information was obtained regarding the distribution of other rural endemic diseases which cause more or less characteristic lesions in the liver, namely, malaria, schistosomiasis (Davis (1), Vilela (8), Pará (7); visceral leishmaniasis (Penna (10); histoplasmosis; (Pará (4); and viral hepatitis (De Paola (12)).

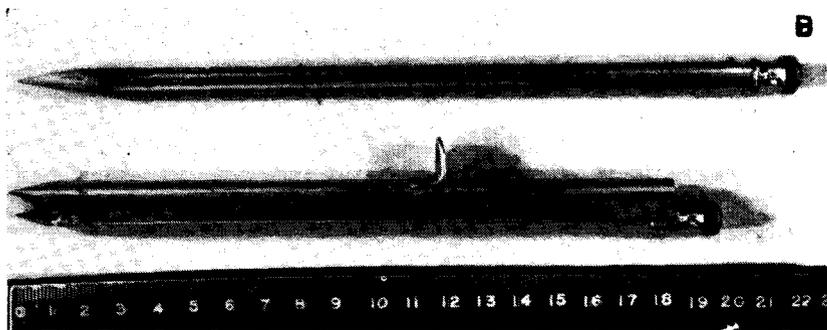
We have always strongly felt the need of a more delicate and practical instrument for viscerotomy purposes to be utilized not only in the rural areas where qualified personnel for necropsy is lacking but also for the histopathological diagnosis of liver conditions in hospitalized patients whose autopsy is not authorized. Besides, our interest in such an instrument became more urgent when a better documentation of a study under the auspices of . . . . . U.S.P.H.S., N.I.H. on Liver and Intestinal Parasitic Diseases became necessary mainly to obtain larger specimens of the liver in cases where necropsies were not allowed. Our long experience with the different types of needles for liver puncture biopsy led us to think of somekind of an enlargement of one of these needles

Fig. 1



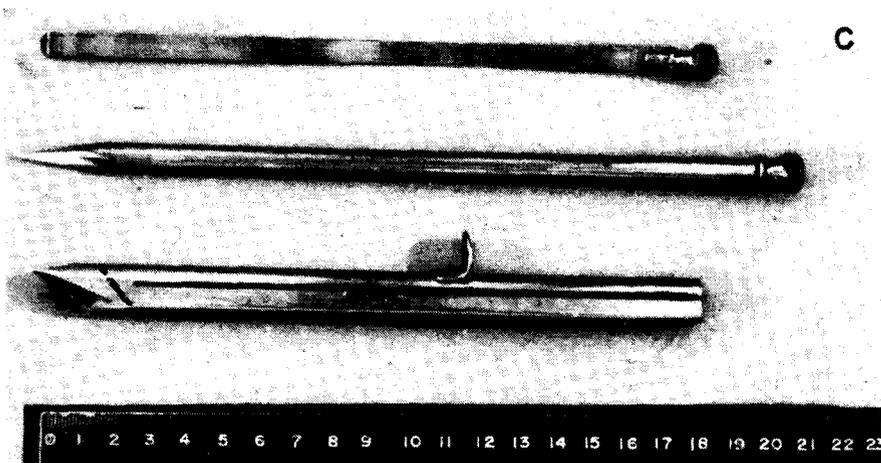
A

Viscerotomes (New and Old)



B

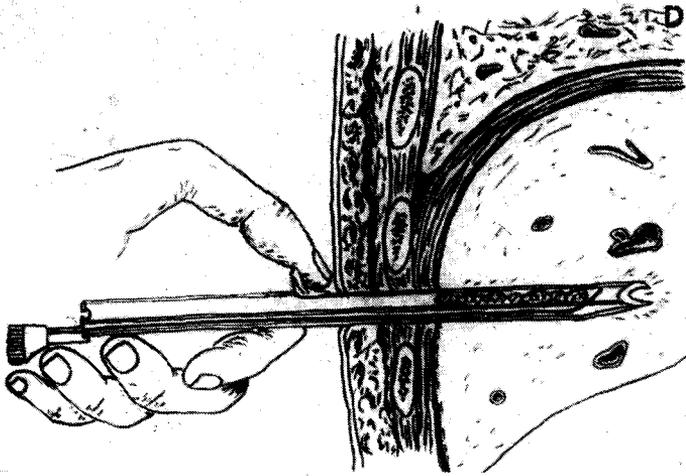
The new viscerotome set, with the section blade in the cutting position



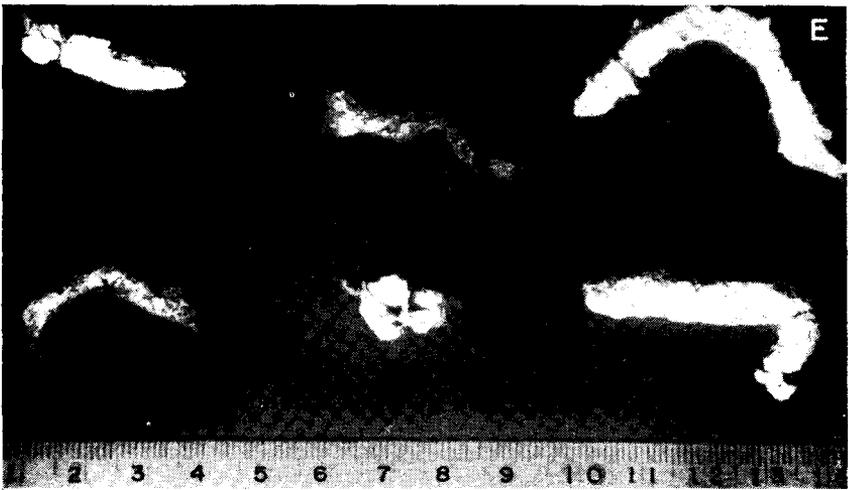
C

New viscerotome in its separate parts.

Fig. 1

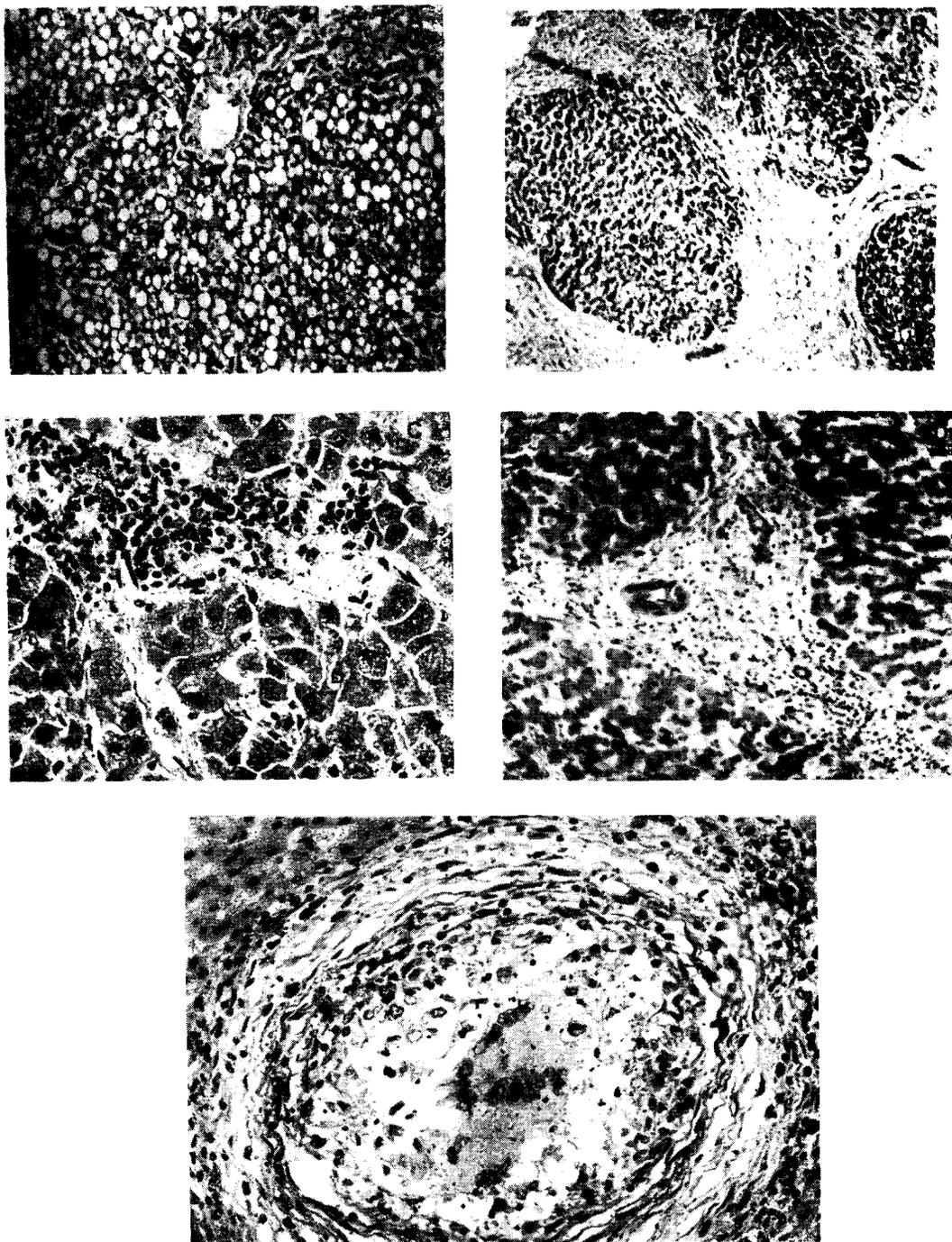


Picture of the instrument at the moment of withdrawal and after obtaining the fragment.



Fragments obtained.

Fig. 2



- A) Hepatic steatosis (H. E. - x 100)  
B) Hepatic cirrhosis (H. E. - x 35)  
C) Viral Hepatitis (H. E. - x 400)  
D) Schistosomiasis mansoni (H. E. - x 100)  
E) South American blastomycosis (H. E. - x 250)

for obtaining larger specimens. In addition such an instrument would have to fulfill the following requirements:

- A. A diameter wide enough to cut a specimen with at least 10 portal spaces in order to give a representative sample of the histopathological morphology of the organ.
- B. A length long enough to allow the removal of a specimen of at least 5 cm.
- C. A design that would permit easy introduction preferably through the chest or abdominal wall and be efficient enough to avoid obtaining fragments other than those desired.
- D. Size and appearance should not make its use objectionable to the family of the deceased (a pocket type, if possible).
- E. The possibility of using it for removal of specimens from other organs besides the liver, for example, spleen, lung heart, etc.

Following many attempts, the three-part instrument under description was considered to fulfill almost all of the above specifications (Figs. 1-B and C).

It consists of a stainless steel rod or trocar with a triangular, sharp point at one end, 22 1/2 cm. in length, 2 1/2 cm. in diameter with a small knob on the top part for easy handling. The trocar is enclosed within a rounded, removeable sheath or case of stainless steel with cutting points at the distal end. One side of the sheath is flat and grooved internally in such a way that a blade of stainless steel 7mm wide and 19 cm. long, with a cutting edge, slides into it. Welded on the outside of the sheath opposite the flat part, is a small piece of steel used as a finger-rest in order that the operator may secure the instrument and keep it from slipping. A small slot on the top of the sheath allows the operator to lock the instrument if necessary.

When the rod or trocar touches the liver or other organ after its penetration through the chest or abdominal wall, the trocar is withdrawn and the sheath is pushed downward to the desired size of

the sample. The blade is then pushed along the grooves to the distal end of the sheath so as to cut the section of the viscera caught in the sheath. After that it is withdrawn with the sample inside. The specimen is removed from the viscerotome and transferred to a fixation solution as desired, for further histological procedures.

It is true that a smaller model of the Rickard viscerotome could improve the original instrument. But if we take into consideration certain difficulties related to the puncture biopsy of the liver we may feel that since that instrument lacks a more efficient cutting edge, which at the same time acts as a mandril, a modification along these lines would be advantageous. Besides that, the mandril definitely avoids, when properly used, the penetration of extraneous viscera into the sheath, a fact which seems to be common with the Rickard model.

The points for the penetration of the viscerotome for liver puncture are the usual ones, intercostal or subcostal, preferably over the right mamillary line (at the first or second last intercostal spaces in cases of non palpable liver).

If necessary, more specimens of the organ may be obtained by introducing the viscerotome again through the original opening using different angles of penetration. The whole instrument must be thoroughly washed after use and the grooves and cutting blade lubricated with light oil.

## RESULTS

A total of 100 liver viscerotomies\* have been performed up to the present time utilizing bodies of victims of street accidents or found dead in the streets. Pictures 1 (E) and 2 (A-E) not only show the aspect of the fragments but their histopathological details in selected cases.

In no instance has the viscerotomy failed to obtain at least one satisfactory specimen even when handled by laymen. Attempts to obtain proper specimens of the spleen and heart have not been successful so far. Efforts to improve the instrument for that purpose are under way.

\* The results related to 50 viscerotomies with this instrument have already been presented in a preliminary note in 1966 (ref. 13)

The histopathological findings in these 100 cases were as follows:

	Number of Cases
1. South American Blastomycosis . . . . .	1
2. Normal liver . . . . .	27
3. Chronic passive congestion . . . . .	16
4. Diffuse fat infiltration . . . . .	29
5. Viral hepatitis . . . . .	4
6. Laennec's cirrhosis . . . . .	5
7. Micro-abscess (pyogenic) . . . . .	2
8. Schistosomiasis (Symmers' Fibrosis) . . . . .	2
9. Autolysed tissue not proper for a correct diagnosis * . . . . .	13
10. Leptospirosis . . . . .	1

\* Due to inadequate preservation of the cadavers.

It must be emphasized that, as almost all specimens were taken from people who died from street accidents, no adequate history for correlation could be obtained. Some indications may be obtained from the results of this small number of observations, namely the high prevalence of cases with diffuse fat infiltration and Laennec's cirrhosis. This would indicate a high occurrence of cases of starvation and/or chronic alcoholism among people who are victims of street accidents. The findings related to three cases of viral hepatitis and two cases of schistosomiasis may only reflect the occurrence of an epidemic of the former in Rio and the high prevalence of the latter among people living in Rio as a rule infected in other areas of the country. Of course these considerations are only important in the

sense that the amount of tissue obtained by the instrument is rather satisfactory, at least for the histopathological diagnosis of liver damage of diffuse nature.

#### FINAL COMMENTS

Regarding the advantages and/or disadvantages of the two viscerotomes, we may point out that in this study it was not possible to have a fair comparison between the two instruments, because:

1) Cadavers preserved in a refrigeration vault were used in all but one case, therefore with the new instrument it proved to be easier to collect liver tissue. Its sharp point and small size facilitated the penetration of the instrument and the utilization of an intercostal space. The almost blunt point of the old instrument and its use through the abdominal wall would make the procedure much more difficult (as proved in the attempts to use it in one case.)

2) To simplify the use of the new instrument, we feel that the use of the sliding blade will not be necessary, provided the instrument is able to penetrate deeply so as to separate a long cylinder of tissue, easily removed after a rotation of the sheath, especially in cases without liver fibrosis.

#### ACKNOWLEDGMENT

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#### S U M Á R I O

*Os Autores descrevem um novo tipo de viscerotomo, menor, mais prático e possivelmente mais indicado para a intensificação da prática da viscerotomia, principalmente em localidades desprovidas de médicos capazes de estabelecerem a causa mortis, através de dados clínicos, laboratoriais ou de necrópsia. O instrumento tem também a indicação em casos falecidos em outras circunstâncias frente à recusa de seus familiares de permitirem a necrópsia.*

*São apresentados os resultados obtidos em 100 viscerotomias praticadas em 99 casos de acidentados do I.M.L. da Guanabara, e 1 caso de morte em hospital, com o novo instrumento, não se registrando uma falha sequer na obtenção de espécimens de fígado, com os seguintes resultados histológicos:*

	Casos
Aspecto Normal . . . . .	27
Congestão passiva crônica . . . . .	16
Esteatose difusa . . . . .	29
Exame prejudicado por autólise . . . . .	13

Hepatite por virus . . . . .	4
Blastomicose sul-americana . . . . .	1
Microabcesso piogênico . . . . .	2
Esquistossomose (Fibrose de Symmers) . . . . .	2
Leptospiroses . . . . .	1
* Cirrose de Laennec . . . . .	5

\* Único doente observado em hospital.

Os dados descritivos do novo instrumento, que se baseia em modelos de agulhas de punção-biópsia do fígado, podem ser melhor apreciados nas figuras apresentadas.

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