平成元年度

帰国研修員フォローアップチーム報告書

—— 循環器病分野公開技術セミナー ——

平成3年3月

国際協力事業団
大阪国際研修センター

序　　文

国際協力事業団は国立循環器病センターの協力を得て、昭和５７年度から平成元年度まで、過去８回に亘って、開発途上国において循環器病研究・治療に従事する医師を対象に、循環器病対策コースを実施してきた。この間、開発途上諸国の中にも経済が発展し、感染症のみならず、循環器病のような先進国型の疾病が顕在化しつつある国が増加し、本コースに対する需要は高まりつつある。

同センターは、東の国立がんセンターと並ぶ西の循環器センターであり、わが国の循環器病研究や治療のメッカとなっている。

本センターでは８年間に５３名を受入れ、帰国研修員はそれぞれの国で、循環器病研究、治療の中心的役割を果している。

こうしたことに鑑み、今般、当事業団は帰国研修員の活動状況を把握し、併せて、当該国の最近の循環器病の実態を調査し、さらに、帰国研修員を中心に当該国の本分野の専門家に、わが国における本分野の最近の医療情報を提供するため、帰国研修員フォロアップ事業の一環としての公開技術セミナーチームを派遣することとなった。対象国は、ブラジル、アルゼンチンの両国とした。

調査団は、両国で公開技術セミナーを実施したほか、関係機関を往訪し、意見交換を行ない、併せて帰国研修員の活動状況を調査した。

本報告書は今回の調査団の活動をまとめたものであるが、関係者のご参考に資すれば幸甚に存じます。

なお、本件実施に際し、ご助力を賜りました内外の各関係者の方々に改めて、謝意を表する次第です。

平成２年３月１日

国際協力事業団
大阪国際研修センター
所長　八島継男

目　　次

添付資料

Ⅰ. 公開技術セミナー調査団派遣の概要

1. 公開技術セミナー調査団派遣の経緯と目的

循環病対策コースは国立循環器病センター（以下循環器センターと略す）を受入れ機関として、昭和57年度から、平成元年度までに合計8回に亘って実施し、開発途上国において循環器病の研究、治療に従事する医師、56名を受入れた。この間、国立循環器病センターは日本の循環器疾病の増加から、本センターの役割はいっそう重要性を増加した。他方、途上国においても多くの国において、生活環境の改善から、循環器疾患を含め、　先進国型の疾病の増加が見られ、本コースに対するニーズが高まった。

第8回目のコースを経て、53名の修了者を出した時点で、第1回のフォローアップチームをブラジルとアルゼンチンに派遣することとした。また、本調査団は同時に近年のわが国における著しく進歩をみた循環器疾患治療の現状を、両者の関係者に紹介する公開技術セミナーを実施した。

対象国として、本コース開始以来のこの8年間において、もっとも多い11名を受入れたブラジルおよび次いで多い8名を受入れたアルゼンチンを採り上げた。

本調査はこの二国を対象とし、以下の目的をもつものである。

(1)　本研修コース帰国研修員の活動状況を調査する。

(2)　本コースで習得した技術を現地において、効果的に活用できるよう指導を行なう。

(3)　両国の循環器病研究分野の調査を実施し、技術面の現状を把握する。

本研修コースは「開発途上国の若手および中堅医師を対象として講義、実習、討議を通じて循環器病の治療の基本知識を習得させ循環器病の専門医を養成することを目的としている」ので、今回の調査、指導によって、今後の研修コースおよび受入体制の改善に寄与することをはかるものである。

同時に当該分野におけるわが国の最新の技術情報や知見を提供するための公開技術セミナーを行ない、帰国研修員の活動を一層活発化させ、かつ対象国の循環器病研究に関する技術水準の向上を図るものである。

2. 調査団員

総　　括	中島伸之	国立循環器病センター	手術部長
循環器病	由谷親夫	〃	病理検査室医長
〃	大江　透	〃	緊急外来課医長
業務調整	橋本文成	国際協力事業団大阪国際研修センター研修課	

（研修員の専門により、研修が各専門研究室に分散、配置されて行われているため、心臓血管外科、心臓血管内科、病理検査の各専門分野の医師3人で構成することとなった。）

3. 日　　程

平成２年１月２０日から、平成２年２月３日

日順	月日	曜日	日　　程
１	１月20日	土	大阪発　（１５：１５　ＪＬ０５２）
			成田着　（１６：２５　〃　）
			〃発　（１９：００　ＲＧ８３５）
２	21	日	サンパウロ着　（　６：５０　〃　）
３	22	月	午前：ＪＩＣＡ事務所打合わせ
			午後：帰国研修員勤務病院の視察
４	23	火	公開技術セミナー開催（講演）、懇親会
５	24	水	〃　（分会）
６	25	木	午前：サンパウロ発　（１０：００　ＶＰ１４３）
			ボルトアレグレ着　（１１：３０　〃　）
			午後：ＪＩＣＡ事務所打合わせ
７	26	金	帰国研修員勤務病院の視察
８	27	土	午前：帰国研修員との意見交換
			午後：ボルトアレグレ発　（１２：３０　ＳＣ９３４）
			ブエノスアイレス着（１５：１５　〃　）
９	28	日	資料整理
１０	29	月	日本大使館、厚生省表敬、ＪＩＣＡ事務所打合わせ
１１	30	火	公開技術セミナー開催（講演）、懇親会
１２	31	水	帰国研修員勤務病院の視察
１３	２月 １日	木	ブエノスアイレス発（２０：００　ＬＡ１４８）
			サンチャゴ着　（２１：０５　〃　）
			〃　発　（２２：３０　ＬＡ１６６）
１４	２	金	ロスアンゼルス着　（　７：２５　〃　）
			〃　発　（１０：００　ＵＡ８０９）
１５	３	土	大阪着　（１７：００　〃　）

＊ブラジル（サンパウロ）での公開技術セミナーは、講演１日、分会１日の計２日間とした。なお、会場は、ブラジル（サンパウロ）ーサンパウロ大学心臓研究所、アルゼンチン（ブエノスアイレス）ーシェラトンホテル。

II. 調査内容及び調査方法

1. 調査内容

(1) 両国の循環器病の実情調査

(2) 両国の病院における循環器病治療の実情視察

(3) 帰国研修員の活動状況調査

(4) 両国の本研修分野におけるニーズ調査

2. 調査方法

(1) 両国の病院を訪問し、帰国研修員およびその上司に意見を徴する。

(2) 両国の窓口機関の意見を徴する。

(3) その他、当該分野の両国の学界および学識者の意見を徴する。

(4) 質問状の配布、回収

(5) 関連資料の収集

3. 訪 問 先

(1) ブラジル

① 心臓研究所（サンパウロ市）

② ポルトアレグレ病院視察（ポルトアレグレ市）

(2) アルゼンチン

① ポサーダス病院（ブエノスアイレス）

4. 調査所感

本コースが医療分野の中でも高度な診断、治療技術を必要とされる循環器病の専門医を養成するものであり、その研修内容もきわめて専門化、高度化しており、研修方式も集団研修コースといえ、実際には各専門研究室に個々に入り、研修を行なっているため、今回の調査においても3名の専門家を配するなど周到な体制を敷いた。

調査の結果、両国の当分野ともこうした研修方式はきわめて好評であった。

本分野のニーズについては、今回の両国における公開技術セミナーに対し示されていよう。ブラジルの纐政剛保健衛生大臣は、調査団に対し、「ブラジルにも世界的レベルの有能な研究者や医師も多い。両国の優れた技術と研究を交換することは医学界にとっても有意義であり、進歩を促すものである。さらに日本の最新鋭の医療技術及び機器は世界のトップを行くが、ブラジル医学界発展のためにこれらの医療技術及び機器利用技術を勉強する機会について、引き続き支援協力を願いたい」と述べ、公開技術セミナーの開催を喜ぶとともに、引き続き本分野における技術協力の要望を表明したことは、本循環器病コースに対する強い期待を実感することができた。

III. 公開技術セミナーの開催

今回のフォローアップ調査団は当該分野の近年の技術進歩が目覚しいため、通常のフォローアップ調査に加え、両国において、それぞれ1回ずつの公開技術セミナーを実施した。

1. 公開技術セミナーの概要

(1) テーマおよび講演者

① 中島　伸之

「大動脈疾患に対する最近の診断法の進歩と外科治療成績」

② 出谷　親夫

「動脈硬化成因における血管平滑筋細胞表現型発現機序」

③ 大江　　透

「心室頻拘の機序に関する検討」

④ アジブ・ジヤテネ（サンパウロ医科大学付属心臓研究所外科部長）（サンパウロ会場のみ）

「臓器の外科的治療について」

⑤ パウロ・グッチエレツ（同研究所解剖学教授）（サンパウロ会場のみ）

「上記、臓器の外科的治療に対する解剖学的コメント）

⑥ ノエデル・ストルフ（同研究所解剖学教授）（サンパウロ会場のみ）

「上に同じ」

⑦ スフアルチ（国立ポサーダス病院外科サービス部長）（ブエノスアイレスのみ）

「アルゼンティンにおける循環器病の現状）

(2) 日時、場所および参加者

① ブラジル（サンパウロ市）

平成2年1月24日～25日

参加者：１００名※

② アルゼンティン（ブエノスアイレス市）

平成2年1月30日

（於シェラトン・ホテル）

参加者：５０人（主として下記関係機関から出席）

共催者：アルゼンティン厚生・社会事業省、アルゼンティン循環器学会、ＪＩＣＡ及び帰国研修員同窓会

※サンパウロセミナーにおける主な主席者

1. 綿政剛厚生大臣
2. フェルナンド・プロフェンサ州保健衛生局副長官

3. フェルビオ・ピレジ同研究所々長
4. 丸山俊二総領事
5. 富田アルベルトＪＩＣＡ帰国研修員同窓会々長
6. ロベルト・イブライン同研究所医学部教授
7. その他、同研究所の教授、助教授、講師、開業医、学生等

2. 公開技術セミナーに対する所感

今回の公開技術セミナーはブラジル、アルゼンティンとも５０名～１００名の参加者を得たうえ、ブラジルでは厚生大臣をはじめ、本分野の同国のトップクラスが参加した。

また、ブラジル、アルゼンティンの両国とも、自国の本分野のトップクラスの学者を講演に立たせたほどの熱の入れようであったことは、両国とも本公開技術セミナーには、なみなみならぬ力を注いだことの証左といえよう。

討議も熱心に行なわれ、セミナーとしても大成功をおさめたといえよう。

【添付資料】

1. 公開技術セミナー配布資料
2. 帰国研修員リスト
3. 主たる面談者
4. 国別受入者数

(JICA GROUP TRAINING COURSE IN CARDIOVASCULAR DISEASES)

SEMINAR ON RECENT CARDIOVASCULAR DISEASES STUDY

1. 公開技術セミナー配布資料

(JICA GROUP TRAINING COURSE IN CARDIOVASCULAR DISEASES)

SEMINAR ON RECENT CARDIOVASCULAR DISEASES STUDY

LIST OF MISSION MEMBERS

1. Team Leader/Vascular Surgery	Dr. Nobuyuki NAKAJIMA Division of Vascular Surgery NATIONAL CARDIOVASCULAR CENTER
2. Pathology	Dr. Chikao YUTANI Division of Pathology NATIONAL CARDIOVASCULAR CENTER
3. Cardiology	Dr. Tohru OHE Division of Cardiology NATIONAL CARDIOVASCULAR CENTER
4. Coordinator	Fuminari HASHIMOTO Training Division Osaka International Training Centre JAPAN INTERNATIONAL COOPERATION AGENCY

THE AORTIC DISEASE: RECENT ADVANCEMENT IN DIAGNOSTIC IMAGING AND THE RESULT OF SURGICAL TREATMENT

Nobuyuki Nakajima, M.D., Ph.D.
Division of Vascular Surgery
National Cardiovascular Center
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The aortic disease, mainly complying aneurysmal formation of the aortic wall, is considered to be a serious disorder and many times leads to a fatal outcome. Apparently, the number of the patients has been increasing in these days, and it has become one of the major categories in the field of cardiovascular disease. Anatomically, the aortic disease includes either thoracic, thoraco-abdominal or abdominal aorta, and the surgical treatment is considerably different depending upon the location of the lesion. They also show varieties of morphological characteristics as well as clinical features, and the majority of the patients who are presented under this category are possible candidates for the surgical treatment.

Following topics will be discussed in the lecture

A. Recent Advancement in Diagnostic Imaging

Recent development in diagnostic imaging is such at the present day that we can quite accurately establish correct diagnosis of the nature of the disease as well as obtain detailed features of morphological changes. Traditionally, the x-ray examination of chest and abdomen played an important role and still does even today, as a basic and routine initial diagnostic procedure to approach the disease. In the case of aneurysmal disorder, we can roughly tell whether lesion exists or not by simply taking a plain chest x-ray film if the lesion occupies thoracic cavity. If dense calcification is observed in an abdominal plain x-ray film, a severe atherosclerotic change of the aortic wall is strongly suspected. However, at the present day, we have very sophisticated tools to evaluate morphological changes of aorta which makes it possible to establish correct diagnosis of the disease. These modern techniques are computer tomography (CT), angiography, nuclear magnetic resonance (NMR), and echo-doppler study. CT has come to be used as a routine technique and has become a fundamental diagnostic examination. Very recently, cine CT (Ematron) has been introduced to practice, by which we can obtain fine visualization of aortic changes. In angiographical field, conventaional cine angiography is totally replaced by digital subtraction angiographic (DSA) method at our institution, enabling us to perform a more convenient way and causing minimum risk to the patients. NMR still remains a sophisticated diagnostic procedure and proves efficent as a mothod of

diagnosis of aortic dissection. Color doppler also has been lately introduced. It is especially helpful to detect flow changes in aortic lumen. Therefore, it is extremely valuable for the diagnosis of aortic dissection. All these modern techniques are applied as a sole diagnostic procedure or used combined depending upon the nature of the disorder.

B. Surgical Treatment for the Thoracic and Thoraco-abdominal Aorta

In surgical treatment of the aorta, only the aneurysmal disease including aortic dissection will be discussed. For the past 10 years, we have performed over 400 cases of surgeries for the thoracic and thoraco-abdominal aorta. 55% of these cases were aortic dissection including dissecting aneurysm, and 45% were aneurysmal disease mainly due to the athero-sclerotic origin. The overall mortality rate in the former category was 15% compared with 25% in the latter. The result has been improving recently with lower mortality rate in both categories of the patients. The surgical treatments in this location cause several difficult problems. These problems are prolonged surgical and cardic arrest time under the surgery with total cardiopulmonary bypass which requires particular attention on the myocardial protection technique during the procedures. Protection of brain in the surgery of transverse aortic arch requires particular attention for supportive measures such as either selective cerebral perfusion or profound hypothermic circulatory arrest technique. For the surgery of descending aorta and thoraco-abdominal aorta, special consideration has to be taken to maintain distal perfusion during aortic cross-clamping as well as the prevention of spinal ischemic damage. This complication is the most serious one, and many focuses have been brought to this problem. The surgical treatments of acute aortic dissection and dissecting aneurysm in chronic phase cause other difficult but interesting problems. Especially, surgical procedure applied to the different types of dissection is a focus of dispute in the recent discussion. Here in the lecture, we will present our approach to these various problems associating with the thoracic and thoraco-abdominal surgery.

C. Surgical Treatment for Abdominal Aortic Aneurysm

The surgical treatments for abdominal aortic aneurysm have become popular and their results have been stable with an average mortality of 40% in elective non-rupture surgical cases, although the mean age of the patients is considerably high at 68 years. As a recent surgical approach to this type of disease, we prefer selecting retroperitoneal approach to access this lesion. This approach is observed to be more comfortable for the patients from the point of minimum postoperative abdominal discomfort and less painful of wound compared with

the conventional transperitoneal approach. Blood salvage during aortic surgery has attracted considerable attention in these days, because the blood transfusion is a serious potential source of contmination of various kind of virus infections. Therefore, it is quite desirable to avoid blood transfusion as much as possible. We designed our own apparatus of auto-transfusion system and have been applying routinely to the surgery of abdominal aneurysm. By using this technique intra-operatively, approximately 25% of the patients were operated without blood transfusion through entire intra and post-operative period.

THE ROLE OF VASCULAR SMOOTH MUSCLE CELLS IN ATHEROGENESIS

Chikao Yutani, M.D., Ph.D.
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To elucidate the mechanism of the development of atherosclerosis, we have investigated the cell population and phenotypes of contractile(C-SMC) and synthetic(S-SMC) states of smooth muscle cells at proximal and distal areas of bifurcation of the celiac and superior mesenteric arteries in children and young persons by transmission electron microscopy.

Percentage of cell population of S-SMCs at proximal areas of bifurcation of both arteries was greater than that of C-SMCs ($p<0.01$). Moreover, percentage of cell population of C-SMCs at distal areas of bifurcation of both arteries was less than that of S-SMCs ($p<0.05$). Percentage of macrophage at proximal areas was greater than that of distal areas.

The results studied in human cases indicated that the cell population of S-SMCs in the patients with hypercholesterolemia was found in the proximal areas (low-shear stress area) more remarkably than in the distal areas (high shear stress area). This implies that the hemodynamic stress (the vortex system) may change the phenotypic modulation of the vascular smooth muscle cells.

In the following study, we have ascertained the same results even in the arteries of children and young persons. Furthermore, we observed that the medial SMCs in both arteries of young persons were clearly made off from the two types of them: the one type was adhered to the focal of the elastic (internal or medial) lamina but the other type was in existence with the separated one, at which place there were a lot of intermediate filaments in their cytoplasms.

As a rule, the migration of smooth muscle cells takes place progressively from the media to the intima. It is probalble that the correlation of the elastic lamina and the medial smooth muscle cells may be an important factor in the progression of the migrational S-SMCs.

These studies revealed that there was a clear difference between the proximal area and distal one in the extracellular matrices of SMCs, especially in the elastic tissue of the celiac and superior mesenteric arteries in a three-year old girl, at which place the diffuse intimal thickening could not be recognized. That is to say, the SMCs at the proximal areas are the S-SMCs containing many synthetic organelles. On the hand, those at the distal areas are the C-SMCs containing actin, myosin, dense bodies, and microtubules.

Recently, we have examined how many SMCs in the media attach to the elastic layers at both proximal and distal areas of the celiac artery in very young persons, because most SMCs in the media on nonbranched artery attach and exist side by side to the elastic layers. At the proximal areas, many SMCs existed free from the elastic layers, where SMCs in free state showed S-SMCs containing intracytoplasmic intermediate filaments. On the contrary, at the distal areas, the elastic layers were scant between C-SMCs existed toward the intima.

The possible mechanisms why the medial SMCs could change their phenotypes from C-SMCs to S-SMCs at the proximal areas are as follows; (1) even when the intimas at the proximal areas do not thicken in the young people, turbulance due to the vortex system occurred at bifurcation will give rise to increase the permeability which makes the growth factors, PDGF or EDGF et al, infiltrate through the intima into the media. (2) mechanical or physical overloading directly to the medial SMCs may lead to active proliferation and to the synthetic type of SMC. (3) the medial SMCs with their development of the bifurcation of the artery may transform from C-SMCs into S-SMCs which may be due to some unknown factors via the vaso vasorum around the branchings.

We need to further investigation of the cytoskeltons like intermediate filaments by using transformation of vimentin to desmin in the S-SMCs in order to understand the phenotypic expression of the SMCs from the point of atherogenesis.

THE MECHANISMS OF VENTRICULAR TACHYCARDIA

Tohru Ohe, M.D., Ph.D.
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National Cardiovascular Center
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Recent electrophysiologic studies suggest that reentry is responsible for the majority of ventricular tachycardia(VT). However, VT, whose electrophysiologic characteristics are difficult to explain by reentry, is often found in clinical practice. Thus, we tried to classify VT into two groups: VT whose electrophysiologic characteristics are compatible with reentry (reentrant VT) and those that are not compatible with reentry (non-reentrant VT).

Furthermore, we tried to classify the reentrant VT into several types according to the characteristics of slow conduction which is a pre-requisite for reentry to occur.

As to non-reentrant VT, we classified VT according to their types: repetitive monomorphic type and Torsades de Pointes.

I. VT whose mechanism is considered to be reentry

1) Sustained monomorphic VT in the patients with organic heart disease:

VT could be initiated and terminated by pacing in the majority of the patients. Entrainment could be demonstrated in half of them. The areas of fractionated activity responsible for slow conduction were found in all of them.

2) VT due to bundle branch reentry:

The VT could be initiated and terminated by pacing. Entrainment could also be demonstrated. Intraventricular conduction delay was responsible for slow conduction.

3) Sustained monomorphic verapamil sensitive VT:

VT could be initiated and terminated by pacing in most of the patient. Entrainment was demonstrated in some of them. Fractionated activity of intraventricular conduction delay could be found in none of the patients. However, it is possible that very slow conduction at a relatively small area produces enough delay for reentry without showing fragmentation in these patients. We suspect that calcium channel conduction might be responsible for the very slow conduction, which may explain why the VT is verapamil sensitive.

Ⅱ. VT whose mechanism is considered to be non-reentry

1) Repetitive Monomorphic VT:

VT could be initiated by isoproterenol or exercise in the majority of the patients. The relation between pacing and VT cycle lengths was direct in all patients in whom pacing repeatedly induced VT. VT could be terminated by pacing in all patients in whom pacing could be tried during VT. The pattern of termination was a delayed type in all of them. The area of slow conduction could be found in none of the patients. These findings suggest that the possibility that triggered activity is responsible for the occurrence of repetitive monomorphic VT.

2) Torsades de Pointes:

VT was initiated by pacing in none of the patients. The area of slow conduction could be found in none of the patients. Monophasic action potential showed a hump at phase 3 which corresponded to an abnormal TU wave in all of them. These findings suggest the possibility that early afterdepolarization is responsible for the occurrence of Torsades de Pointes.

51th Annual Scientific Session of the Japanese Circulation Society
April 1, 1987, Tokyo
President: Hirokazu Niitani, Showa University

PANEL DISCUSSION ON PROBLEMS IN THE TREATMENT OF CARDIOVASCULAR DISEASES IN THE ELDERLY

Current Surgical Treatment and Results for Aneurysm of the Thoracic Aorta in Elderly Patients

NOBUYUKI NAKAJIMA, M.D., SEIJI ADACHI, M.D., MOTOMI ANDO, M.D.
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Japanese Circulation Journal
Vol. 52 No. 5 May 1988
(Pages 477—481)

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During the period from January, 1983 to December, 1986, a total of 199 patients with thoracic aortic aneurysm underwent surgical treatment in our Cardiovascular Surgical Service. During this period, criteria for surgical indications were established and general surgical principles and techniques were standardized. As a consequence, surgical results appeared to stabilize during this period. It was clearly established that the surgical result for patients over 65 years was poor with high mortality compared to the younger age group (38.6% vs 7.2%). This tendency was in sharp contrast to that of abdominal aortic aneurysm surgery where low mortality (3%) was obtained regardless of age. Other factors influencing high mortality were as follows: 1) atherosclerosis as an etiological background, 2) aneurysm situated at the aortic arch, 3) Urgency for surgery, 4) pre- and postoperative status of respiratory and renal function. Late follow-up results showed that 25% of patients died, while 66% are in fair condition.

THORACIC aortic anurysm has been recognized as a lethal disease and, when allowed to develop, will eventually lead to serious rupture and endangering of the patient's life.[1,2] Therefore, it is generally agreed that if the aneurysmal size reaches a certain point or if a complication develops because of the presence of the aneurysm, surgical intervention is indicated. On the other hand, the surgical technique for thoracic aortic aneurysmectomy is not only complicated but also quite invasive for patients because it usually requires certain supportive measures during cross-clamping of the aorta such as cardiopulmonary bypass or creation of a temporary bypass, as well as requiring thoracic exploration. As a result, although the surgical outcome for thoracic aortic aneurysm in Japan has been improving, it is still not satisfactory even at the present moment.[3] In this paper, we try to analyse results of surgery on thoracic aortic aneurysm at our institution, especially in relation to the age of the patient as well as to the factors influencing his survival.

Key words:
Thoracic aortic aneurysm
Surgical treatment
Surgical result
Elderly patient

MATERIALS

Our institution was established in September 1977, since when a total of 300 surgeries for aneurysm of thoracic aorta have been performed by our cardiovascular surgical service. We have analysed only the latest 199 consecutive cases operated on during the period from January 1983 to December 1986 when the surgical techniques and their operative results appeared to be stable.

Surgical indications for resection of the aneurysm of the thoracic aorta

The surgical indications for aneurysm of the thoracic aorta differ between those for true aneurysm of saccular and fusiform type and the

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	No	Male:Female	Average age	≥65 years	≥70 years
Thoracic aortic aneurysm	199	6 : 4	56. 1	28. 1% (60)	14. 5% (29)
Abdominal aortic aneurysm	177	9 : 1	66. 9	64. 4% (114)	45. 1% (80)

( ) No of patient

Fig.1. The sex and age distribution of thoracic aneurysm surgery are compared to abdominal aneurysm surgery during the period from 1983.1. to 1986.12. (NCVC)

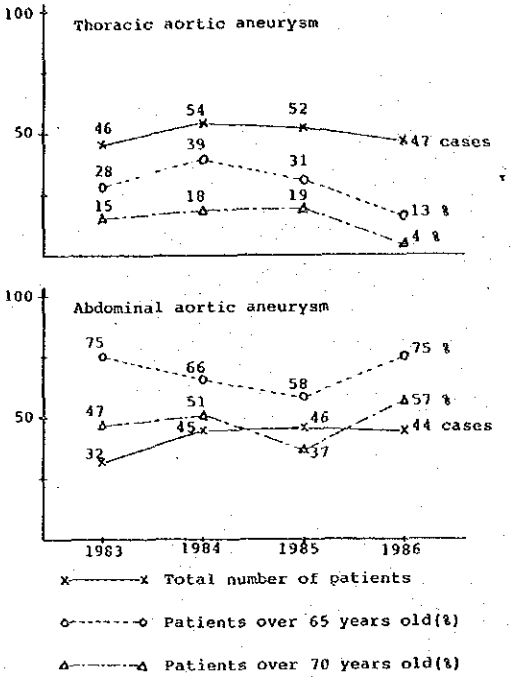

Fig.2. Number of surgeries of old age patients by year, thoracic aortic surgeries are compared to abdominal aortic surgery.

dissection of the aorta. In true aneurysm, surgical indications are judged and influenced by the following various factors. (a) Morphology and size: a saccular or a fusiform type. We consider that the saccular type is more likely to be in danger of rupturing than the fusiform type. The caliber of an aneurysm grows to at least twice the normal diameter of the aorta at its anatomical position. (b) Etiological factor: whether the aneurysm is caused by a degenerative disease such as Marfan's syndrome or has an atherosclerotic origin or inflammatory origin. (c) Location; whether it is situated at the ascending, aortic arch, descending or thoraco-abdominal part of the aorta. (d) Risk factors and associated disease: as risk factors, we study cardiac (history of myocardial infarction and angina pectoris), respiratory (% VC and %FEV 1.0), cerebral and renal function (Ccr ≥ 30 ml/min). (e) Age: whether the patient's age is below or over 70. (f) Urgency for surgery: whether emergency surgery is indicated because of rupture or presence of a serious complication. On the other hand, in dissection of the aorta, the surgical indications are considered according to the following factors. (a) Type and stage: in proximal type dissection (DeBakey type I, II and arch dissection), surgical repair is generally indicated at all stages including acute and chronic phase. In distal type (DeBakey type III), medical treatment is generally applied in acute phase but in chronic phase, the patient is referred for either medical or surgical treatment mainly due to the age of the patient. (b) Associated complications: when serious complications are associated with a dissection, such as rupture, cardiac tamponade, organ ischemia and so on, surgery is absolutely indicated regardless of the age of the patient. (c) Increase in the size of dissection in the follow-up.

Operative technique

The operative techniques used during the period varied according to the type (true aneurysm or dissection) and the location of lesion. However, the general principle for both types of lesion was resection of lesion and graft replacement surgery.

The supportive measures applied during the aortic cross-clamping differed according to the anatomical location of the aneurysm. In ascending and arch aneurysm, total cardiopulmonary bypass with or without separate perfusion to the brain was performed whereas partial cardiopulmonary bypass or temporary subclavio- or axillo-femoral bypass was used for the descending aneurysm.

RESULTS

The sex and age distribution of the patients

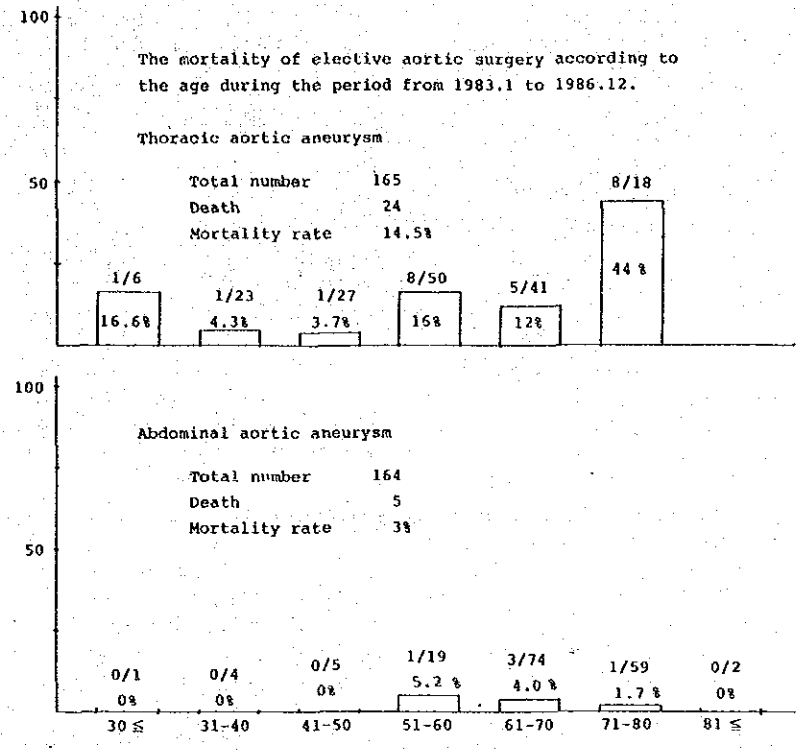

Fig.3.

who underwent thoracic aortic aneurysm surgery were analysed and compared to that of abdominal aortic surgery in Fig. 1. The male to female sex ratio was 6 to 4 and average age was 56.1 years old. The age distribution over the age of 65 years among 199 patients was 28.1% and that of over 70 years was 14.5%. There was a sharp contrast with abdominal aortic aneurysm cases both in sex ratio and age distribution in elderly patients (Fig. 1). The number of surgical procedures performed in elderly patients per year was compared in thoracic and abdominal aortic aneurysm and is illustrated in Fig. 2. The number of surgical procedures carried out in elderly patients appears to be declining in recent years in thoracic aneurysm, whereas it seems to be increasing in abdominal aortic aneurysm, although the total number of procedures per year is the same in both groups. The mortality following elective surgery for thoracic and abdominal aortic aneurysm according to age is analysed in Fig. 3. It shows that the average mortality among 165 patients was 14.5% in the thoracic group, while a high rate of 44% was observed in elderly patients over 70 years old. In comparison, the overall mortality in 164 patients of the abdominal group stayed at 3% and the rate did not tend to increase even in the elderly patient group.

The etiological factors that influence mortality in elective surgery were studied. The main etiological factors underlying the development of aneurysmal formation were atherosclerosis, cystic medical necrosis, inflammation and dissection. The highest mortality was of atherosclerotic origin which showed the average age of patient to be 63.5 ± 7 and a mortality of 19%. However, this rate increased to 24.1% for patients over the age of 65. The mortality in cystic medical necrosis, inflammation and dissection were 7, 10 and 6% respectively. The mortality in dissection for the elderly patient over the age of 65 was 30%.

Further analysis on the various factors influencing the surgical results on thoracic aortic aneurysm in relation to age was undertaken and listed in Fig. 4. The overall mortality including elective and emergency surgery for the patient over 65 years old was found to be 38.6% whereas it was 7.2% in those younger than that age. This clear tendency toward a higher mortality in the

		True aneurysm		Dissection		Ascending	Arch	Descending
	Overall	Elective	Emergency	Elective	Emergency			
Age≧65 years old	38.6%	24.1%	55.5%	30%	33%	30%	44.4%	24.2%
Age<65 years old	7.2%	2.4%		13.7%	22.2%	10.1%	16.6%	10%

% : Mortality rate

Fig.4. Various factors influencing for the surgical results of thoracic aortic aneurysm.

	Cerebral	Coronary	Respiratory	Renal
No Pts with normal function	103→1(2) 1%	99→1(0) 1%	91→10(4) 11%	98→12(4) 12%
No Pts with impaired function	10(9%)→1(1) 10%	7(6%)→1(1) 14%	22(19%)→10(4) 45%	* 12(11%)→10(2) 83% ** 3(3%)→3(2) 100%

( ) : No of death % vc : * 1.4≦Scr<2.0
% : Incidence FEV 1.0 ** Scr≧2.0

Fig.5. Risk factors of patients with thoracic aortic aneurysm of atherosclerotic origin influencing for the surgical result.

Number of patients discharged	36
Number of late follow up death	9 (25%)
Continuation of postoperative complication	2
Survival with good condition	24 (66%)
Lost in the follw up	1

Fig.6. The late follow up result of patients over the age of 65 years old who underwent thoracic aortic aneurysm surgery.

older age group was apparent in all the categories whether it was elective or emergency surgery, true aneurysm or dissection. For the anatomical location of the lesions, highest mortality of 44.4% was observed in aortic arch aneurysm, followed by 30% in the ascending aorta and 24.2% in the descending aorta (Fig. 4).

The risk factors of patients who had thoracic aortic aneurysm of atherosclerotic origin which influenced surgical outcome were also studied. These risk factors-cerebral function, history of coronary disease, respiratory and renal function were analysed and listed as normal or impaired. It was found that the respiratory and renal functions were affected most by the surgery which showed that 11% and 12%, respectively, of patients who exhibited normal function before surgery deteriorated postoperatively. If any impairment of function existed before surgery, it continued to be present after the surgery and contributed to the mortality of patients regarding either respiratory or renal function (Fig. 5).

The general condition of the patient over the age of 65 years who underwent thoracic aneurysm surgery in the late follow up period is summarized in Fig. 6. A total of 36 patients were discharged after surgery and 9 died in the late follow up, which yielded a 25% mortality. The continuation of postoperative complications, mainly cerebral dysfunction, were observed in 2 patients; the other 24 patients, or 66%, are living a normal life in good health.

DISCUSSION

The number of operative cases for thoracic aortic aneurysmectomy in Japan is steadly increasing. However, the results seem to be not satisfactory in comparison to those of the United States and European countries.[4,5] The operative mortality and morbidity appear to be high in Japan, and a clear explanation for this must be found and thoroughly studied. We understand that in japan, modern surgical techniques for this particular type of lesion have been closely approaching the equivalent level in those foreign countries. Therefore, the factors influencing our results appear to stem from other factors.

When we consider the operability of a patient who has an aneurysm in his thoracic aorta, various factors have to be studied and evaluated to justify the surgical intervention. First of all, the indication for surgery is the most important. We have tried to establish our own criteria for surgery over the last few years and

have been treating patients according to this principle. The surgical techniques applied have also been changing and various modifications have been attempted. However, during the study period of this paper, basaic principles were established.

Through our study, it was clearly found that the operative outcome related to mortality for thoracic aortic aneurysm was very much poorer than that of abdominal aortic aneurysm surgery, even though both disorders are considered to be diseases of the great vessels. In elective surgery, the average mortality due to surgery of thoracic aortic aneurysm was 14.5%, but that of abdominal aortic aneurysm was as low as 3%, even though the average age for the former was quite low at 56.1 year old, compared to the latter at 66.9 years. Mortality is definitively affected by age as is shown in Fig. 3; it reached 44% in the group of patients aged over 70, Reflecting this fact, the number of surgical procedures carried out in the older age group of patients sharply declined in 1986.

It is well known that the etiological background of the majority of aneurysms is atherosclerotic—in other words, the ageing-degenerative process of the aortic wall. Atherosclerosis is considered to be a systemic disease and frequently contributes to risk factors in patients. Our data confirmed these assumptions and showed that the atherosclerotic origin exhibited the highest mortality among the various etiological factors, such as cystic medial necrosis, inflammatory origin and dissection. By further analysis of individual factors influencing surgical results of thoracic aneurysm, taking age into account, it was clearly demonstrated again that the elderly group over 65 years old had a poorer mortality than the younger age group under 65 in all aspects including true aneurysm, dissection and the difference in anatomical location of the lesion. Concerning this last point, aneurysm situated in the aortic arch accounted for 44.4% of the mortality in the old age group. As a preoperative evaluation of our patients, we routinely studied cerebral, cardiac, respiratory and renal functions. Of these, respiratory and renal function influenced the outcome of surgery and were considered to be major risk factors to the patient.

Thoracic aortic aneurysm is a serious disease and surgery on the lesion is quite invasive. Because of this, the late follow up results of patients in our series appeared to be somewhat unstatisfactory; 25% of patients died in the follow up period for various reasons, while 66% survived in a healthy state.

REFERENCES

1. PRESSLER V, McNAMARA J: Thoracic aortic aneurysm, Natural history and treatment. *J Thorac Cardiovasc Surgery* 79: 489, 1980
2. BICKERSTAFF L, PAIROLERO P, HOLLIER H, MELTON J, VAN PEENEN H, CHERRY K, JOYCE J, LIE J: Thoracic aortic aneurysm; A population-based study. *Surgery* 92: 1103, 1982
3. NAKAJIMA N, ANDO M, KAWAZOE K, KASEGAWA H, ADACHI S, FUJITA T: An analysis of surgical treatment for thoracic aortic aneurysm and their surgical result in short follow up. *J Jap Associ Thorac Surg (JJATS)* 34 (Suppl): 226, 1986 (in Japanese)
4. CULLIFORD A, AYVALIOTIS B, SHEMIN R, COLVIN S, ISOM W, SPENCER F: Aneurysm of the ascending aorta and transverse arch. *J Thorac Cardiovasc Surg* 83: 701, 1982
5. CRAWFORD S, SNYDER D: Treatment of aneurysms of the aortic arch. *J Thorac Cardiovasc Surgery* 85: 237, 1983

Idiopathic sustained left ventricular tachycardia: clinical and electrophysiologic characteristics

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ABSTRACT Electrophysiologic studies were performed in 16 patients 11 to 45 years old (mean 33 years) with idiopathic sustained (lasting more than 5 min) ventricular tachycardia (VT) originating from the left ventricle. Endocardial mapping during VT showed that the earliest site of activation was at the apical inferior portion of the left ventricle in 14 patients whose QRS morphology during VT showed a right bundle branch block pattern and left-axis deviation, but at the apical anterosuperior portion of the left ventricle in two patients whose QRS morphology during VT showed a right bundle branch block and right-axis deviation. Single programmed ventricular stimulation induced VT in 13 patients, and rapid ventricular pacing induced VT in the remaining three patients. Rapid ventricular pacing terminated VT in all patients. The relationship between the coupling interval and the echo interval was inverse in all eight patients with a wide VT inducible zone. Entrainment was recognized in three of six patients. The initiation of VT by constant pacing depended on the number of pacing beats but not the duration of pacing in all four patients tested. Intravenous verapamil terminated the VT in 13 of 14 patients. Long-term oral verapamil was also effective in all five patients who required long-term oral therapy for their symptoms associated with VT. In conclusion (1) idiopathic left ventricular tachycardia has unique electrocardiographic, electrophysiologic, and electropharmacological properties, (2) the electrophysiologic characteristics suggest that the mechanism is reentry, and (3) verapamil is effective in both the short- and long-term treatment of VT.
Circulation 77, No. 3, 560–568, 1988.

IDIOPATHIC sustained ventricular tachycardia (VT) has recently been characterized by its QRS morphology during VT (right bundle branch block and left axis deviation) and its responsiveness to verapamil.[1-3] The QRS configuration of the tachycardia suggests that it originates from the Purkinje fiber network of the left posterior fascicle.[3] However, extensive endocardial mapping has not been done to confirm the origin of this VT.

Reentry has been postulated as the mechanism for the VT on the basis that it can be induced and terminated by extrastimuli.[1, 2] However, recent electrophysiologic studies in animals have shown that tachycardia due to triggered activity can also be induced and terminated by extrastimuli.[4] Thus, further evidence is required to clarify its mechanism.

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Received April 21, 1987; revision accepted Nov. 12, 1987.

The purpose of this study was to investigate in consecutive patients with sustained VT originating in the left ventricle and without overt evidence of organic heart disease (1) the origin of VT, (2) the electrophysiologic characteristics of VT, (3) the efficacy of antiarrhythmic drugs, and (4) long-term clinical follow-up.

Methods

From January 1979 through December 1986, 16 patients with recurrent sustained VT of left ventricular origin, but without clinical evidence of heart disease, were studied at the National Cardiovascular Center of Osaka, Japan. The mean age of the patients at the time of our evaluation was 31.3 ± 14.0 years. Sustained VT was defined as protracted paroxysmal runs of VT lasting longer than 5 min and usually requiring pharmacologic or electrical intervention. The absence of organic heart disease was diagnosed by: (1) normal cardiac examination, (2) normal resting electrocardiogram, (3) normal chest x-ray, (4) lack of significant ST depression or ST elevation during or after a submaximal treadmill exercise test, (5) a normal echocardiogram (no structural cardiac abnormalities, no enlargement of the cardiac chambers, normal left ventricular wall thickness, and normal left ventricular wall motion), and (6) a normal radionuclide angiogram (no enlargement of the cardiac chambers and normal left and right ejection fraction). In 10 patients, left ventricular angiography, right ventricular angiography, and coronary arteriography were performed to establish that no struc-

tural heart disease was present. The left origin of the VT was determined by ventricular endocardial mapping during VT.

Electrophysiologic studies. After giving informed written consent patients underwent electrophysiologic studies performed while they were in the postabsorptive state. Antiarrhythmic medications were discontinued at least 3 days before the studies. His bundle electrograms were recorded by a standard technique. A bipolar electrode catheter was passed into the high right atrium for stimulation of the atrium. A second bipolar electrode catheter with an interelectrode distance of 10 mm was introduced into the right ventricle for stimulation or recording from the right ventricle. A third bipolar electrocatheter with a 10 mm interelectrode distance of introduced into the left ventricle for stimulation of or recording from the left ventricle. Surface electrophysiologic leads (I, II, V_1, and V_5) and intracardiac electrograms were simultaneously recorded on a multichannel photographic recorder (Simens-Elma Mingograf 82) at a paper speed of 100 mm/sec. A His potential during VT was confirmed by recording the potential just before the initiation and immediately after the termination of Vt while fixing the electrode catheter. Electrical stimuli of 2 msec duration and approximately twice the diastolic threshold were provided by a programmable digitial stimulator (Fukuda Denshi Cardiac Stimulator; BC-A).

Atrial pacing, programmed ventricular extrastimulation, and ventricular pacing were performed for induction of VT. Atrial pacing was performed from the right atrium. The duration of stimulation was 30 sec. Stimulation was performed selecting an initial rate just above the spontaneous sinus rate. The rate was increased by 10 beats/min until atrioventricular block occurred.

During programmed ventricular extrastimulation, the ventricle was paced at two different cycle lengths (600 and 400 msec). If a single ventricular extrastimuli failed to elicit VT, timed double ventricular extrastimuli were delivered until VT was provoked or until all extrastimuli failed to evoke ventricular responses. If VT was not induced with the extrastimuli, incremental ventricular pacing at cycle lengths of 400 to 240 msec for periods of 5 to 30 sec was performed. Stimulation was first performed at the right ventricular apex, but when VT was not induced, the same stimulation protocols were repeated at the right ventricular outflow tract. When VT was induced neither by stimulation at the right ventricular apex nor the right ventricular outflow tract, the protocols were repeated at the left ventricular apex. The tachycardia was considered inducible only when the induced ventricular tachycardia replicated the spontaneous tachycardia in both morphologic characteristics and rates.

The site of the earliest ventricular activation of the VT was determined by endocardial mapping during VT of eight sites in the right ventricle and 12 in the left ventricle by the technique of Josephson et al.[5] Pace-mapping was also performed from the sites of earliest activation in eight patients. As to the nomenclature of left ventricular subdivisions, we followed the recommendations of the Committee on Nomenclature of Myocardial Wall Segments of the International Society of Computerized Electrocardiography.[6]

The relationship between the coupling interval (the interval between the last beat of basic cycle length and the premature beat) and the echo interval (the interval between the premature beat and the first beat of the VT) was determined in eight patients in whom a wide range of single ventricular stimuli initiated the VT (patients 1, 4, 6, 8, 9, 11, 14, and 16). The presence of progressive fusion was assessed by pacing from the right ventricle during VT in six patients (patients 1, 8, 9, 14, 15, and 16). The presence of fragmentation or delayed potentials during normal sinus rhythm was examined by recording the electrogram from eight sites in the right ventricle and 12 sites in the left ventricle. In four patients (patients 1, 3, 4, and 5) in whom rapid pacing consistently induced VT the relationship between the number of pacing beats and the induction of VT was examined. A pacing cycle length that consistently induced VT was used. The pacing was started at 2 beats and was increased in increments of 1 beat up to 14 beats and repeated several times to determine whether the induction of VT was dependent on the number of pacing beats.

Antiarrhythmic drugs. The termination of VT with drugs was attempted by the intravenous administration of one or more of the following agents on different occasions during spontaneous or induced VT. The interval between testing various drugs was at least 72 hr to avoid overlap of pharmacologic effects. (1) ajmaline, 50 mg, over 5 min; (2) lidocaine, 100 mg, over 30 sec; (3) propranolol, 10 mg, over 5 min; and (4) verapamil, 10 mg, over 5 min.

Antiarrhythmic drugs were considered effective when they terminated sustained VT. Five patients (patients 4, 5, 6, 9, and 12) were placed on long-term oral verapamil, 240 mg/day, for troublesome symptoms associated with VT. The efficacy of long-term oral therapy was assessed by clinical history and Holter monitoring.

Results

Characteristics of VT. The clinical and electrophysiologic characteristics of all patients are presented in table 1. The QRS morphology during VT was a right bundle branch block pattern, defined as having the wide terminal R or R′ in V_1, in all patients. The electrical axis during VT was leftward in 14 patients (figure 1, *A*) and rightward in two patients (figure 1, *B*).

Endocardial mapping. During normal sinus rhythm, fragmentation or delayed potentials were recognized in none of the 16 patients. The site of earliest ventricular activation of the VT could be determined by endocar-

TABLE 1
Clinical data

Patient No.	Age (yr)/ sex	Duration (yr)[A]	Rate/ min (VT)	QRS morphology (VT)	Symptoms
1	63/M	1	180	RBBB, LAD	Palpitations
2	25/M	2	188	RBBB, LAD	Palpitations
3	23/F	7	180	RBBB, LAD	Palpitations, syncope
4	12/F	2	200	RBBB, LAD	Palpitations
5	13/M	2	214	RBBB, LAD	Palpitations, dyspnea
6	31/F	1	170	RBBB, LAD	Palpitations
7	25/F	3	186	RBBB, LAD	Palpitations
8	31/M	4	220	RBBB, LAD	Palpitations
9	41/M	10	240	RBBB, LAD	Palpitations, vomiting
10	41/M	1	210	RBBB, LAD	Palpitations
11	22/M	9	170	RBBB, LAD	Palpitations
12	31/F	10	200	RBBB, LAD	Palpitations
13	48/M	3	180	RBBB, LAD	Palpitations, vomiting
14	19/F	5	194	RBBB, RAD	Palpitations
15	30/M	2	160	RBBB, RAD	Palpitations
16	45/M	3	160	RBBB, LAD	Palpitations

RBBB = right bundle branch block pattern; LAD = left-axis deviation; RAD = right-axis deviation.

[A]Period of time since onset of symptoms.

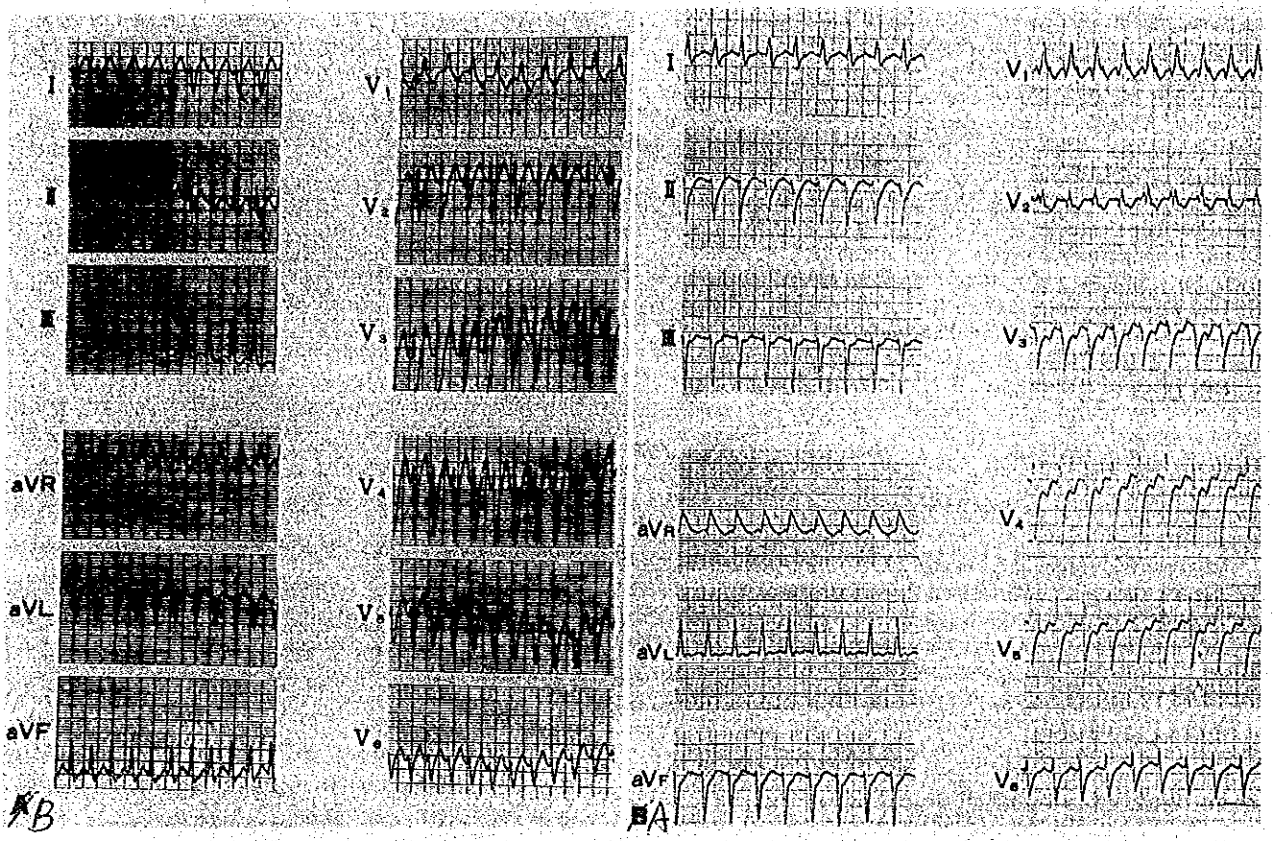

FIGURE 1. *A*, Electrocardiogram obtained during VT in patient 1. Note that the QRS configuration is a right bundle branch block pattern with left-axis deviation. *B*, Electrocardiograms obtained during VT in patient 14. Note that the QRS configuration is a right bundle branch block pattern with right-axis deviation.

dial mapping in all 16 patients (figure 2). Fragmentation preceded ventricular activation in none of the patients and the earliest ventricular activation during VT coincided with or was within 10 msec of QRS onset in all patients (figure 3). The earliest activations were at the apical inferior site of the left ventricle in 14 patients whose QRS morphology during VT showed left-axis deviation (patients 1 to 13 and 16 and at the apical anterosuperior site in two patients whose QRS morphology during VT showed right axis deviation (patients 14 and 15). Pacing from the site of earliest activation, performed in eight patients, produced an identical QRS configuration to that of VT in all of them (figure 4). A His potential was recorded during VT in 10 patients. It occurred 20 to 30 msec after the earliest ventricular activation in all of them (figure 5). Ventriculoatrial conduction was present during tachycardia in two patients (patients 8 and 13), but it could be interrupted by carotid sinus pressure without terminating the tachycardia in both of them.

Electrophysiologic characteristics of VT. The electrophysiologic characteristics of VT in all patients are presented in table 2. Atrial pacing induced VT in four of 16 patients. A single ventricular extrastimulus induced VT in 13 of 16 patients. Rapid ventricular pacing was required to induce VT in three patients; this was accomplished from the right ventricular apex in one patient and from the left ventricle in two patients. Nonclinical VT that was not electrocardiographically identical to that occurring spontaneously was not observed in any patient.

Of the 13 patients in whom the single ventricular extrastimuli induced VT, eight patients had a wide zone of coupling intervals during which VT could be induced. In these patients, the relationship between the premature coupling interval (the interval between the last beat of the basic cycle length and the premature beat) and the echo interval (the interval between the premature beat and the first beat of the VT) was determined. The relationship was inverse in all of them. A typical example is shown in figure 6 (patient 9).

The relationship between the number of pacing beats and the induction of VT was examined in four of 16 patients (Nos. 1, 3, 4, and 5). In patient 1, the VT was induced with a greater frequency by 4, 7, 8, 12, and 13 pacing beats than by 3, 5, 6, 9, or 10 beats (figures 7 and 8). Similarly, the induction of VT was closely related to a certain number of pacing beats at a critical

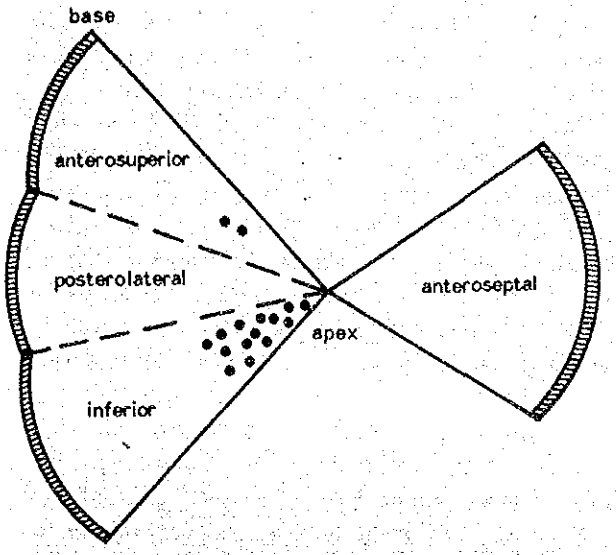

FIGURE 2. The site of the earliest ventricular activation of VT (indicated by closed circles) in all patients. The left ventricle is subdivided into four portions: anteroseptal, anterosuperior, inferior, and posterolateral. The left ventricle is further subdivided into three regions from apex to base: apical, middle, and basal. Note that the VT originated from the apical inferior region in 14 patients, and from the apical anterosuperior region in two patients.

pacing rate in the remaining three patients examined.

Progressive fusion was demonstrated in three of six patients. A representative example is shown in figure 9, (patient 16).

Rapid pacing from the right ventricular apex terminated VT in all 16 patients.

Effective drugs for the termination of VT. The drugs found to be effective in terminating VT in all patients are listed in table 3. Lidocaine terminated VT in two patients. Ajmaline terminated VT in 13 of 15 patients. Verapamil terminated VT in 13 of 14 patients.

Long-term prophylactic effects of verapamil. Of 13 patients in whom verapamil effectively terminated VT, five (Nos. 4, 5, 6, 9, and 12) required long-term oral therapy for their troublesome symptoms associated with VT. They were placed on 240 mg/day oral verapamil and were followed for 1 to 6 years (mean 2.8 years). One patient (patient 4) has been free of symptomatic VT. In the remaining four patients, the VT became nonsustained and patients improved clinically.

Discussion

Localization of VT. Most VT originating in the left ventricle in adults is associated with ischemic heart disease, in contrast to VT originating in the right ventricle, which has been recognized in patients with right ventricular dysplasia, postsurgical congenital heart disease, and sometimes in patients without organic heart disease.[8] However, recurrent sustained VT originating

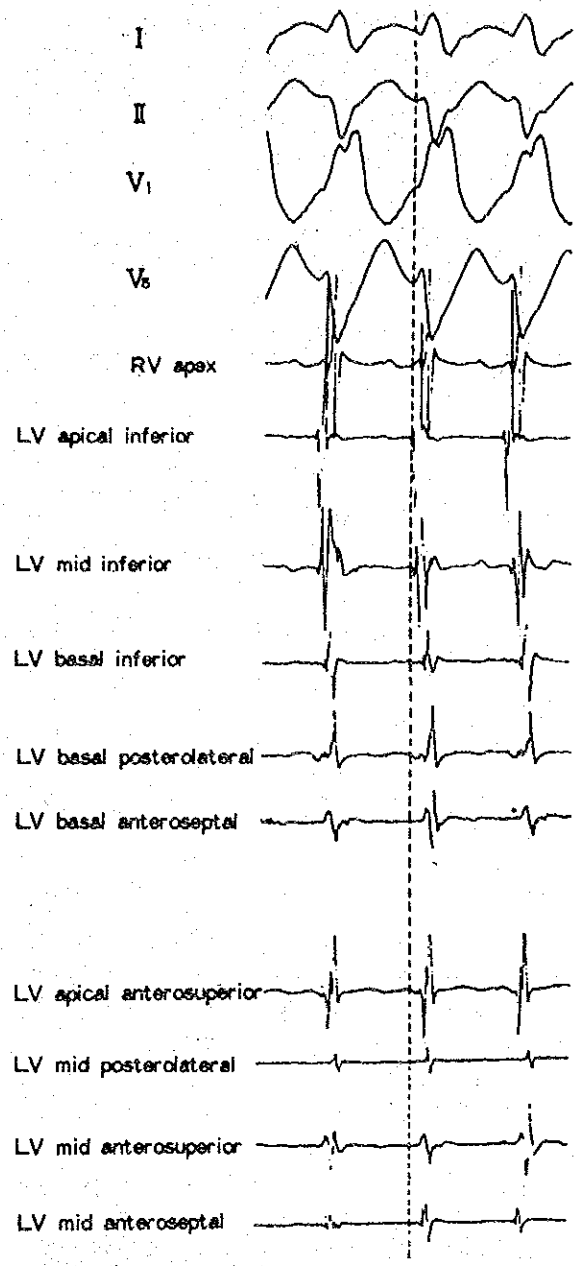

FIGURE 3. Endocardial mapping during VT in patient 1. Surface leads I, II, V_1 and V_5 are recorded with multiple time-aligned bipolar endocardial recordings. Note that the earliest endocardial activity is observed at the apical inferior site of the left ventricle.

in the left ventricle in patients without detectable heart disease has been recognized for several years.[1–3, 7] Usually, this idiopathic left ventricular tachycardia is characterized by the configuration of left-axis deviation in addition to right bundle branch block. Belhassen et al.[1] and Denes et al.[8] have reported VT with such morphologic characteristics. German et al.[3] reported a similar VT in 10 patients without apparent organic heart disease and found that the earliest ventricular activity during VT occurred at the region of the left

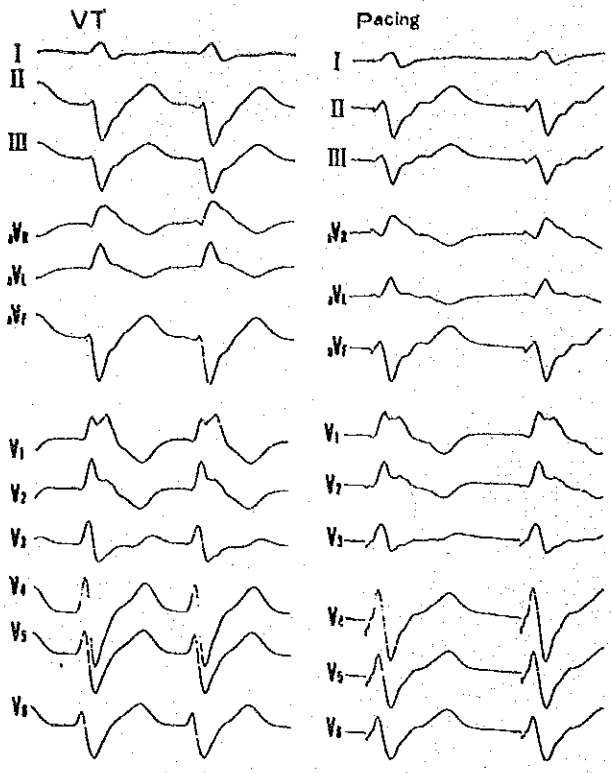

FIGURE 4. Pacing from the site of earliest ventricular activation during VT (apical inferior site of the left ventricle) in patient 16. Note that pacing this site produces QRS complexes very similar to the spontaneous VT.

ventricle supplied by the posterior division of left posterior fascicle. In the present study, the configuration of VT showed right bundle branch and left-axis deviation in 14 patients (figure 1, *A*), and right bundle branch block and right-axis deviation in two patients (figure 1, *B*). Endocardial mapping during VT showed that the earliest ventricular activation was at the apical inferior region of the left ventricle in all 14 patients in whom the QRS configuration of the VT showed right bundle branch block and left-axis deviation, while it was at the apical anterosuperior region of the left ventricle in two patients in whom VT showed right bundle branch block and right-axis deviation (figure 2). The fact that pacing from the site of the earliest ventricular activation produced very similar QRS complexes to the VT suggests that the earliest activation site indicates the origin of VT in these patients (figure 4). Endocardial mapping also showed that the His bundle potential during VT occurred 10 to 20 msec after the earliest ventricular activation, suggesting early retrograde conduction to the His bundle (figure 5). The results of endocardial mapping and pace-mapping suggest that VT with a QRS configuration of right bundle branch block and left-axis deviation originates within the Purkinje network of the posterior division and that the QRS configuration of right bundle branch block and right-axis deviation originates within the Purkinje network of the anterior division of the left bundle block.

Electrophysiologic characteristics of VT. Both reentry and triggered activity have been postulated as possible mechanisms for the chronic sustained VT in patients without apparent organic heart disease. German et al.[3] suggested that the mechanism responsible for the VT was reentry and that a reentrant circuit was located in the Purkinje fiber network of the left posterior fascicle, thus explaining its characteristic QRS configuration and its property of induction and termination by extrastimuli. Lin et al.[2] reported three patients with similar VT and came to the same conclusion regarding the mechanism of the VT. Zipes et al.[9] reported three patients with similar VT, but they suggest that triggered activity might have been responsible for the condition in one of them. The assumption that the VT is a reentrant tachycardia has mainly depended on the observation that it could both be induced and terminated by extrastimuli. However, tachycardia due to triggered

TABLE 2
Electrophysiologic data

Patient No.	Mode of initiation[A]	VT zone (msec)	Coupling interval vs echo interval	Progressive fusion
1	S, A	280-240	I	−
2	S	300-280	?	NT
3	S	290-280	?	NT
4	S	300-270	I	NT
5	S, A	300	?	NT
6	S	260-200	I	NT
7	B, A	—	?	NT
8	S	300-220	I	−
9	S, A	320-280	I	+
10	B	—	?	NT
11	S	320-290	I	NT
12	S	300	?	NT
13	B	—	?	NT
14	S	270-230	I	+
15	S	310-300	?	+
16	S	430-360	I	+

All patients' VT terminated with pacing, and none showed fragmentation.

A = VT induced by atrial pacing; S = VT induced by a single ventricular stimulus; B = VT induced by burst ventricular pacing; VT zone = a range of coupling intervals that induced VT during a single extrastimulus method; VT zone (−) = VT not induced by a single extrastimulus; I = the relationship between the coupling interval and the echo interval was inverse; ? = the relationship could not be determined; − = progressive fusion not present; + = progressive fusion present; NT = progressive fusion not tried.

[A]The site of stimulation was the right ventricular apex in all but patients 10 and 13, in whom it was the left ventricular apex.

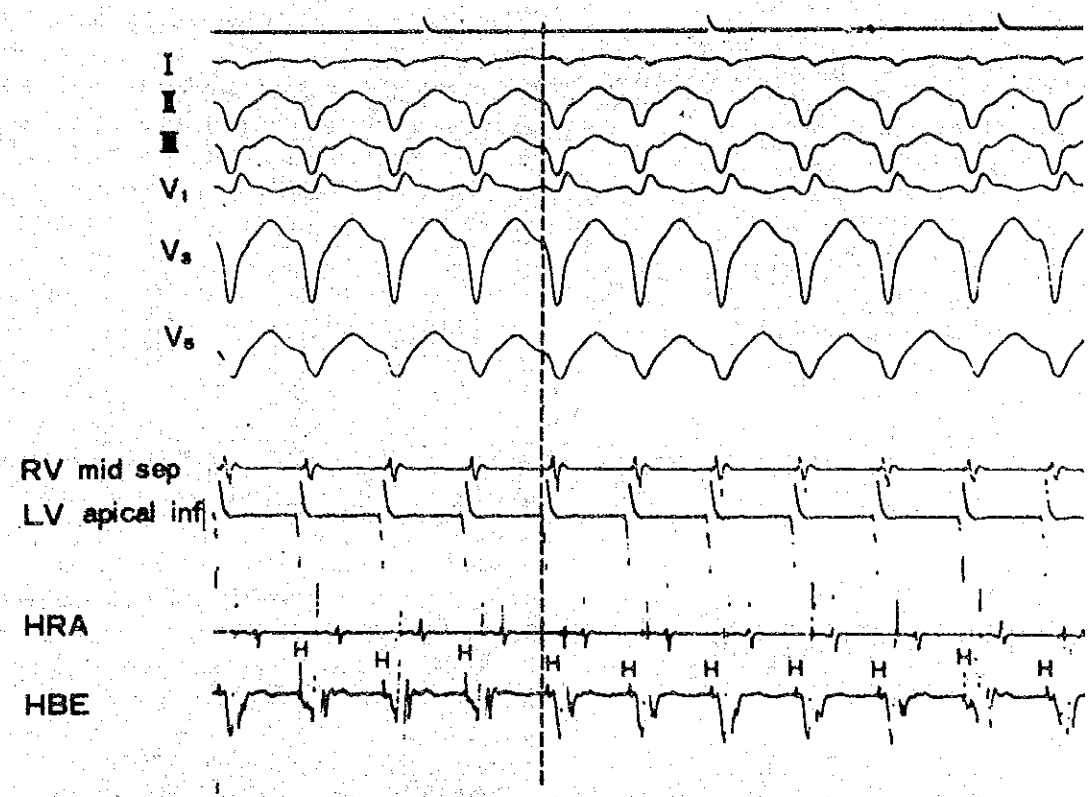

FIGURE 5. His bundle recording during VT in patient 13. Surface leads (I, II, III, V_1, V_3, and V_5) are recorded with the intracardiac recordings, which were as follows: right ventricular mid septum (RV mid sep), apical inferior portion of the left ventricle (LV apical inf), high right atrium (HRA), and His bundle (HBE) electrogram. Note that the onset of the QRS coincides with the activity of the left ventricular apical inferior region, and precedes the His bundle activity by 20 msec.

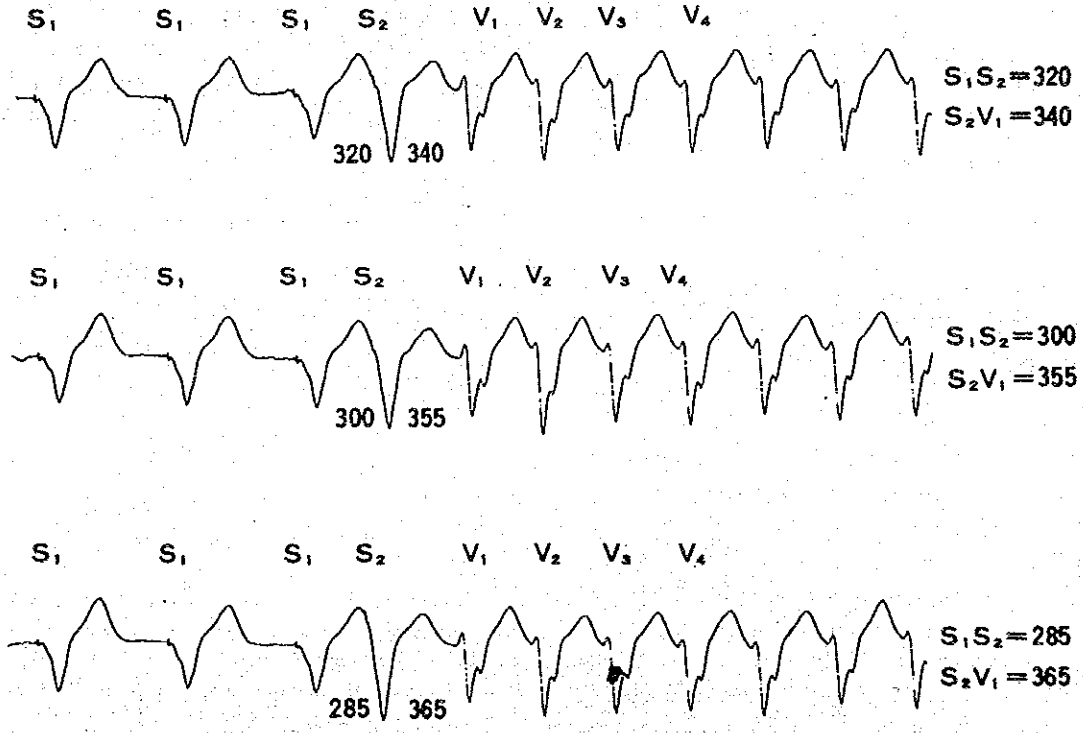

FIGURE 6. The relationship between the premature coupling interval (S_1-S_2) and the echo interval (S_2-V_1) at a basic cycle length of 600 msec (S_1-S_2) in patient 9. Note that as (S_1-S_2) becomes shorter (320 to 285 msec), (S_2-V_1) becomes longer (340 to 365 msec), suggesting an inverse relationship.

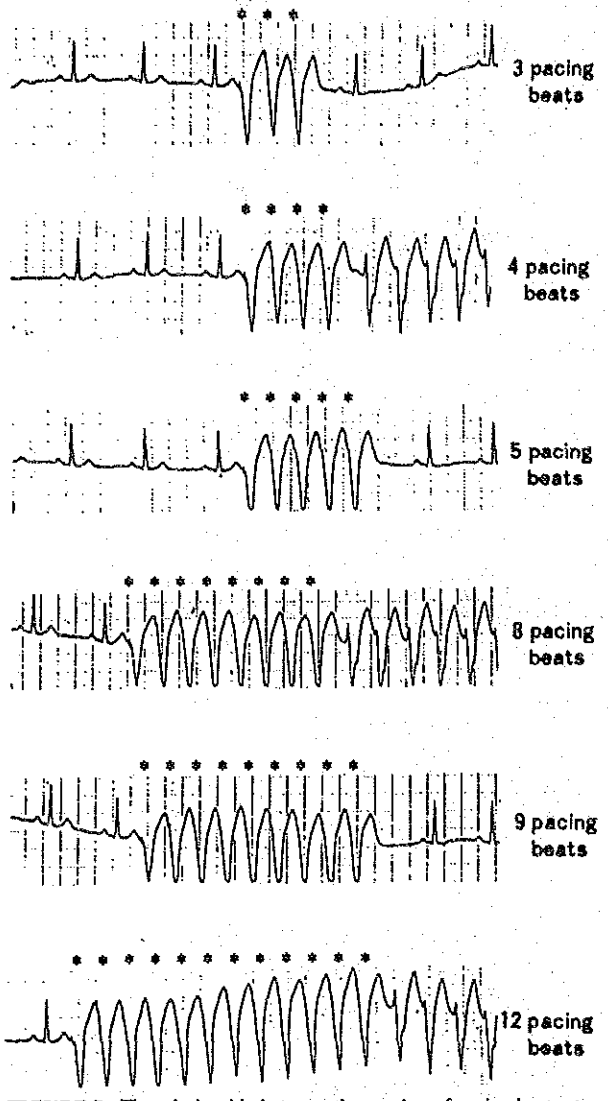

FIGURE 7. The relationship between the number of pacing beats at a cycle length of 300 msec and the initiation of VT in patient 1. Note that 4, 8, and 12 pacing beats induced VT, but 3, 5, and 9 pacing beats did not.

activity may also be started or stopped by a single premature stimulus.[4] Thus, in the present study, three other electrophysiologic characteristics were examined: (1) the relationship between the premature coupling interval and the echo interval, (2) the relationship between the number of pacing beats and the induction of VT, and (3) the presence of progressive fusion.

In reentrant tachycardia, such as atrioventricular reentrant tachycardia, atrioventricular nodal reentrant tachycardia, and VT associated with old myocardial infarction, the relationship between the premature coupling interval and the echo interval is usually inverse.[10] In contrast, in triggered tachyarrhythmias, the relationship is typically direct.[4] The fact that the relationship was consistently inverse in all our patients suggests that its mechanism was reentry.

That the initiation of tachycardia by constant pacing depends on the basic cycle length is characteristic of both reentry and triggered activity. Also, the ability to initiate tachycardia is closely related to the number of pacing beats in both kinds of tachycardia. However, in triggered activity, the longer the period of fixed pacing, the greater the chance of induction.[11] In contrast, in reentrant tachycardia, certain numbers of pacing beats are more likely to induce tachycardia at a critical pacing rate. This may be caused by a Wenckebach type of conduction in one of the two pathways in addition to the presence of unidirectional block. The Wenckebach type of conduction delay is important for the initiation of reentrant tachycardia, and has been observed in patients with atrioventricular nodal reentrant tachycardia during constant ventricular pacing at a rate at which type I second-degree ventriculoatrial block occurs.[12, 13] In the present study, the initiation of VT was closely related to the number of pacing beats but not to the duration of pacing. In patient 1, VT was initiated with greater frequency by 4, 7, 8, 12, and 13 pacing beats, and less frequency by 3, 5, 6, 9, and 10 beats at a pacing cycle length of 300 msec (figures 7 and 8). This suggests that conduction of a Wenckebach type in the reentrant pathway was present at a cycle length of 300 msec.

The presence of progressive fusion as defined by Waldo et al.[14] is one of the characteristics of reentry. The fact that it was recognized in only three of six patients in the present study is not inconsistent with reentry, since the ability to satisfy this criterion provides strong evidence confirming the mechanism of

TABLE 3
Effective drugs for termination of VT

Patient No.	Lidocaine	Ajmaline	Verapamil
1	–	+	+
2	+	+	+
3	–	+	+
4	+	+	+
5	–	+	+
6	–	+	+
7	–	+	+
8	–	+	–
9	–	+	+
10	–	+	NT
11	–	+	+
12	–	–	+
13	–	–	+
14	–	NT	+
15	–	+	+
16	–	+	NT

+ = terminated VT; – = failed to terminate VT; NT = not tested.

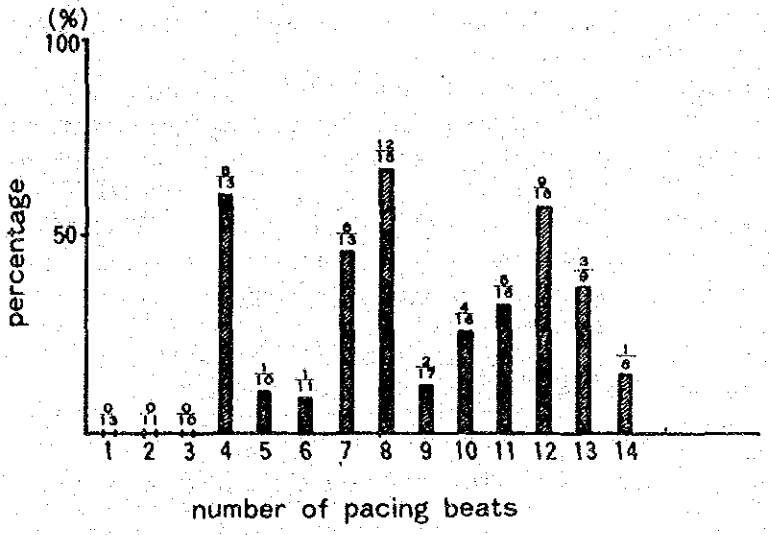

FIGURE 8. The relationship between the number of pacing beats at a cycle length of 300 msec and the initiation of ventricular tachycardia in patient 1. The percentage of times that VT was initiated is indicated on the vertical axis, and the number of pacing beats is indicated on the horizontal axis. The denominators represent the number of trials; the numerators represent the number of trials in which VT was initiated. Note that VT was initiated with greater frequency by 4, 7, 8, 12, and 13 pacing beats and with less frequency by 3, 5, 6, 9, or 10 beats.

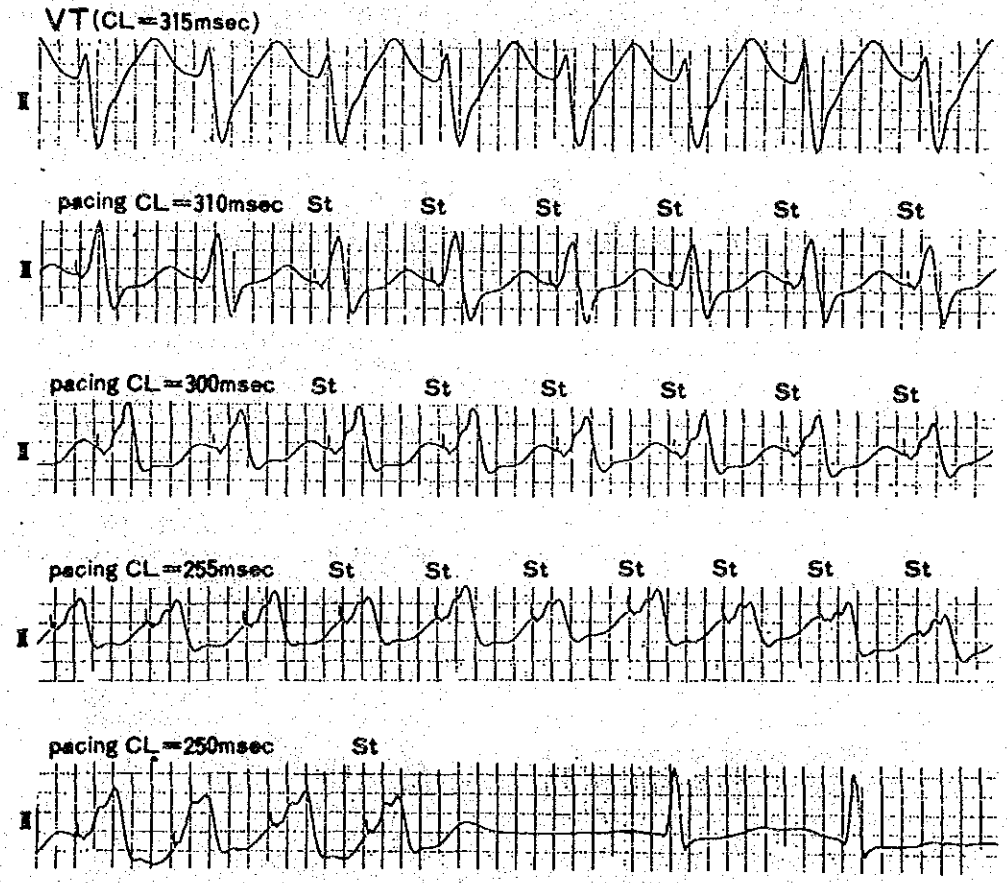

FIGURE 9. Progressive fusion in patient 16. The first trace shows electrocardiographic lead II during VT (cycle length 315 msec). Second, third, fourth traces show electrocardiographic lead II during periods of transient entrainment pacing from the right ventricular septum at cycle lengths of 310 (second trace), 300 (third trace), and 255 msec (forth trace). The bottom trace shows electrocardiographic leads II after interruption of pacing from the right ventricular septum at a cycle length of 250 msec. The top trace shows the morphology of ventricular complexes during VT. The morphologies of the ventricular complexes in the second through the fourth traces represents different degrees of ventricular fusion (progressive fusion) during transient entrainment at the respective pacing rates. The morphologies of the ventricular complexes on the bottom trace represent ventricular activation by pacing from the right ventricular septum.

reentry, but the absence of progressive fusion does not exclude reentry. In fact, the demonstration of progressive fusion requires the presence of an excitable gap in part of the reentrant loop.

Fragmentation is thought to represent an area of slow conduction that is a prerequisite for reentry.[15] It is usually recorded before the onset of the QRS complex during VT in patients with associated organic heart disease. However, the fact that fragmentation could not be recorded during normal sinus rhythm or during VT in any of the patients in the present study is not inconsistent with reentry. It is possible that very slow conduction at a relatively small area produces enough delay for reentry without slowing fragmentation, as is seen in conduction within the atrioventricular node.

In summary, these electrophysiologic characteristics, in addition to the fact that the VT could be induced and terminated by pacing, strongly suggest that the mechanism of the VT was reentry.

Antiarrhythmic drugs and patients follow-up. One of the characteristics of idiopathic VT with a configuration of right bundle branch block and left-axis deviation is that it is responsive to verapamil but not responsive to lidocaine or propranolol. The present study shows that not only idiopathic VT with the configuration of right bundle branch block and left-axis deviation but also VT with right bundle branch block and right-axis deviation had the same electropharmacologic characteristics. The mechanism by which verapamil is effective in terminating this VT remains to be elucidated, but it is possible, as German et al.[3] have suggested, that part of the circuit of the VT contains a calcium channel–mediated pathway. This may explain the facts that the VT could be terminated by verapamil and that no recognizable organic change could be demonstrated, suggesting that the area responsible for slow conduction was relatively small.

The present study confirms that intravenous verapamil is very effective in terminating VT and also shows that long-term oral verapamil is effective clinically. One patient placed on oral verapamil became asymptomatic, and all the remaining patients on verapamil improved symptomatically as the VT became nonsustained. The reason that oral verapamil did not suppress VT completely is probably related to the dose since 240 mg/day is a relatively small dose for adult patients.

We drew the following conclusions from this study: (1) Chronic sustained VT originating from left ventricle in patients without apparent organic heart disease has peculiar electrocardiographic, electrophysiologic, and electropharmacologic characteristics. (2) The electrophysiologic characteristics of the VT suggest that the mechanism is reentry. (3) Verapamil is effective for both short- and long-term treatment of this VT.

References

1. Belhassen B, Rotmensch HH, Laniado S: Response of recurrent sustained ventricular tachycardia to verapamil. Br Heart J 46: 679, 1981
2. Lin FC, Finely CD, Rahimtoola SH, Wu D: Idiopathic paroxysmal ventricular tachycardia with a QRS pattern of right bundle branch block and left axis deviation. A unique clinical entity with specific properties. Am J Cardiol 52: 95, 1983
3. German LD, Packer DL, Bardy GH, Gallagher JJ: Ventricular tachycardia induced by atrial stimulation in patients without symptomatic cardiac disease. Am J Cardiol 52: 1202, 1983
4. Moak JP, Rosen MR: Induction and termination of triggered activity by pacing in isolated canine Purkinje fibers. Circulation 69: 149, 1984
5. Josephson ME, Horowitz LN, Farshidi A, Spear JF, Kastor JA, Moore EN: Recurrent sustained ventricular tachycardia. II. Endocardial mapping. Circulation 57: 440, 1978
6. Startt/Selvester RH: Recommendations for nomenclature of myocardial subdivisions. J Electrocardiol 19: 3, 1986 (editoral)
7. Lesch M, Lewis E, Mumphries ON, Ross RS: Paroxysmal ventricular tachycardia in the absence of organic heart disease. Report of a case and review of the literature. Ann Intern Med 66: 950, 1967
8. Denes P, Wu D, Dhingra R, Amat-y-Leon F, Wyndham C, Mautner RK, Rosen KM: Electrophysiological studies in patients with chronic recurrent ventricular tachycardia. Circulation 54: 229, 1976
9. Zipes DP, Foster PR, Troup PJ, Pedersen DH: Atrial induction of ventricular tachycardia. Reentry versus triggered automaticity. Am J Cardiol 44: 1, 1979
10. Ohe T, Shimomura K, Matsuhisa M, Kamakura S, Shimizu A, Aihara N, Sato I, Nakajima K: The electrophysiological characteristics of various types of paroxysmal tachycardias. Jpn J 50: 99, 1986
11. Wald RW, Waxman MB: Pacing-induced automaticity in sheep Purkinje fibers. Circ Res 48: 531, 1981
12. Bauernfeind RA, Welch WJ, Herre JM: Paroxysmal supraventricular tachycardia. *In* Mandel WJ, editor: Cardiac arrhythmias. Their mechanisms, diagnosis, and management. Philadelphia, 1987, Lippincott, p 266
13. Urthaler F: Ventricular echo beats during ventricular pacing or junctional bradycardia: studies in the normal canine heart. Am Heart J 111: 672, 1986
14. Waldo AL, Plumb VJ, Arciniegas JG, Maclean WAH, Cooper TB, Priest MF, James TN: Transient entrainment and interruption of the atrioventricular pathway type of paroxysmal atrial tachycardia: a model for understanding and identifying reentrant arrhythmias. Circulation 67: 73, 1983
15. Josephson ME, Horowitz LN, Farshidi A: Continuous local electrical activity. A mechanism of recurrent ventricular tachycardia. Circulation 57: 659, 1978

Estado actual de la Cirugía Cardiovascular en la Argentina

Dr. Dino B.Sfarcich

La cirugía vascular argentina tuvo en todas sus épocas una preponderancia mundial, habiendo hecho aportes importantes que trascendieron las fronteras del País.

Ya en 1910 Aquiles Pirovano, discípulo de Carrell realiza el primer injerto arterial en el mundo con arteria homóloga extraída de un cadáver de 10 hs. para reemplazar un aneurisma sifilítico de ilíaca primitiva. El paciente falleció a los 18 días con una peritonitis pero con el injerto permeable.

En 1914 Luis Agote realiza también por primera vez en el mundo una transfusión con sangre conservada.

En 1924 Julio Diez, opera la primera simpaticectomía lumbar para las arteriopatías oclusivas crónicas. René Leriche en el 12° Congreso de la Societè Internationale de Quirurgie en Londres en 1947 propone y es aceptado por todos los delegados el nombre de operación de Julio Diez.

Comienza en el mundo, la cirugía arterial directa y en 1951 Maetz Molins realiza la primera revascularización carotídea en el mundo, en un paciente con lesiones oclusivas crónicas.

Realizó resección de la zona estenótica de la carótida interna y la anastomosó con la carótida externa. El enfermo vivió sin inconvenientes, con la carótida interna permeable.

En 1967 René Favaloro realiza en Cleveland la revascularización aorto coronaria para las oclusiones crónicas, operación propuesta en 1964 por Edwar Garret, pero sin lugar a dudas fue en esa fecha donde comenzó la cirugía de revascularización que se difundió por todo el mundo.

Otro argentino de renombre mundial Domingo Liotta trabaja en E.E.U.U. con corazón artificial que se usa por primera vez en Houston años más tarde.

La primera etapa de la cirugía cardiovascular se vió influenciada, lo mismo que toda la cirugía argentina, por la escuela europea. En la segunda etapa los cirujanos se formaron en los centros de Estados Unidos, regresando luego al país y poniendo en marcha la cirugía cardiovascular que ya había comenzado en forma aislada.

En el momento actual el País cuenta con 25 centros de cirugía cardíaca. Once de ellos están en la Capital Federal, 6 en el Gran Buenos Aires, 2 en la ciudad de La Plata, 2 en Córdoba, 2 en Mendoza y 2 en Rosario.

La cirugía vascular además de estos centros, se realiza en casi todos los Servicios de Cirugía del País.

Para una población de 14.000.000 de habitantes que cuenta Capital Federal y Gran Buenos Aires, funcionan 17 centros que tienen no solo esta área de influencia, sino que reciben pacientes del interior del País.

En el interior 8 centros trabajan en las ciudades más importantes de las Provincias.

Se realizan aproximadamente 5.000 operaciones anuales, para una población de 30.000.000 de habitantes.

En 3 centros de Capital Federal se concentran casi la mitad de las intervenciones.

El 70% son patología coronaria y el 30% valvulares.

Se han realizado en el País 37 transplantes cardíacos. Hay 2 centros habilitados en Capital Federal y uno en el Gran Buenos Aires. En los de Capital Federal se realizaron la mayoría de éstos, 26 transplantes.

La cirugía cardíaca pediátrica se desarrolla en 7 centros, 5 en la Capital Federal y 2 en la ciudad de Córdoba. En 3 de estos centros se realizan exclusivamente cirugía infantil. Se operan aproximadamente 1.660 pacientes anuales.

3. 国別年度別研修員参加実績表

昭和57年度（2名）

No.	国名 Country	氏名，現職及び生年月日 Name, Present Post, & Date of Birth	勤務先及び自宅住所 Home & Office Address
1	 Brazil	* Ana Maria Brito Medeiros * Physycian, State Department of Public Health, Rio Grande do Sul * Oct. 24, 1951	* Home : Av. Venâncio Aires Nº 48 apto 705, Porto Alegre RS BRAZIL * Office : Rua Borges de Medeiros, 1501 6º ander, Porto Alegre RS BRASIL
2	 Brazil	* Fatima Regina de Miranda Machado * Assistant Prof., Institute of Geriatrics, Pontifical Cathoric University * Jan. 5, 1955	* Home : Rua Cristovão Colombo 288 apto 4, 90.000 Porto Alegre RS BRAZIL * Office : Av. Ipiranga 6690 90.000 Porto Alegre RS BRAZIL

昭和58年度（1名）

4	 Brazil	* Luiz Renato Bretas Netto M.D. * Cardiologist, Instituto Nacional de Assistencia Medica da Previdencia Social * August 10, 1945	* Home : Higs 710, Bloco "J", Casa 32, CEP 70360, Brasilia, D.F., BRAZIL * Office: EQS 712-912 (Pam-Central-INAMPS) Brasilia, D.F., BRAZIL

昭和60年度（3名）

1	 Brazil	Carlos Floriano de Morais Assistant Pathologist, Heart Institute (Instituto do Coracao INCOR), Faculty of Medicine of University of Sao Paulo (USP) November 29, 1952	Home: Rua José Maria Lisboa, 730, Ap, 24 CEP 01423-Sao Paulo Brazil Office: Av. Dr. Enéias de Carvalho Aguiar, 44-CEP 05403-Sao Paulo-Sao Paulo-Brazil

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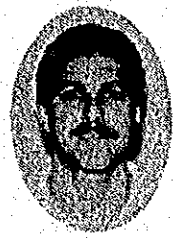
2	 Brazil	Paulo Rogério Wasserstein Hekman Member of the Clinical Staff of the Geriatric Institute of Pontifical Catholic University of Rio Grande do Sul October 5, 1957	Home : Rua Liberdade, 183 Atp 401 90,000-Porto Alegre-RS -Brazil Office: Av. Ipiranga, 6690-3 andar 90,000 Porto Alegre-RS-Brazil
3	 Brazil	Kenqo Baba Member of the Department of Cardiovascular Surgery of the Hospital Evangélico of Londrina September 4, 1953	Home : Rua. Hugo Cabral, 950 Apt 301 Londrina-PR -Brazil Office: Rua. Oakland, 301 Jardim Quebec Londrina-PR- Brazil

昭和61年度（2名）　　専門研修分野

6	 Brazil	Caio César Jorge Medeiros（メデイロス） Attending Physician Heart Institute of São Paulo-Clinics Hospital of São Paulo University (INCOR) March 27, 1959	Home : R. Dr. José Cândido de Souza, 526 Cep : 04518 São Paulo Office : INCOR, São Paulo University, R. Dr. Eneas de Carvalho Aguiar, 44 Cep : 05403 São Paulo	小児科
7	 Brazil	Ângelo José Gonçalves Bós（ゴンサルヴェス） Clinical Staff member, Geriatric Institute of Pontifical Catholic University of Rio Grande do Sul July 2, 1959	Home : Travessa Comendador Batista, 29, 90.050-Porto Alegre Office : Sanitary Unit of Murialdo of State of Rio Grande do Sul Av. Vidal de Negreiros, 443, 90.000 Porto Alegre	動脈硬化

昭和６３年度（２名）

No.	国　名 Country	氏名，現職及び生年月日 Name, Present Post, Date of Birth	勤務先及び自宅住所 Home & Office Address	専門研修分野
4	 ブラジル Brazil	*Mr. Jose Carlos Mulaski ムラスキ *Cardivascular Surgeon Hospital de Clinicas Universidade Federal do Parana パラナ大学付属病院 *February 6, 1959（29才）	*Home：Rua Conselheiro Lanrindo 41-ap. 64 *Office：Rua General Carneiro, 181	心臓血管外科
5	 ブラジル Brazil	*Mr. Roberto Telles de Freitas Ludwig ロベルト *Cardiologist Hospital de Clinicas de Porto Alegre ポルトアレグレクリニック病院 *December 3, 1953（35才）	*Home：Felix da Cunha 1164/23 *Office：Rua Ramiro Barcelos 2350 Porto Alegre	放射線

平成元年度（１名）

No.				
5	 Brazil	*Mr. STEYER, Arno Rainer アルノ *ICU Medical Doctor, Philanthropic Institute *March 27, 1956 (33)	*Office：IRMANDADE DA SANTA CASA DE MISERICORDIA DE PORTO ALEGRE HOSPITAL Praca Dom Feliciano, s/nº 90.000, Porto Alegre-RS, Brazil *Home：Rua：Padre Hildebrando, 585/605 91030: Porto Alegre, Brazil	心臓血管内科

昭和58年度（1名）

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1	 Argentine	* Eduard Manuel Casal M. D. * Staff Surgen, Posadas Hospital, National Public Health Department * June 27, 1954	* Home : Bulnes 1940 Piso 3º Dept. "C" Buenos Aires, ARGENTINE * Office: Defensa 152 Buenos Aires, ARGENTINA

昭和59年度（1名）

1	 Argentine	* Fernando Gette * Staff surgeon Posadas National Hospital National Public Health Dept. * April 8, 1956	* Home : Maria y Paraguay, Don torcuato, (1611) Provincia de Buenos Aires, Argentine * Office : Martinez de Hoz y Marconi Haedo, Buenos Aires, Argentine

昭和61年度（1名）　　専門研修分野

2	 Argentina	Jorge Reilly（レイリィ） Staff medical, Hospital Interzonal Olavarría August 5, 1950	Home : Vicente López No 3158 Olavarría Provincia de Buenos Aires Office : Intendencia Municipal de Olavarría San Martíny Rivadavia, Provincia de Olavarría, Buenos Aires

心臓血管外科

昭和62年度（ 2名 ）

No.	国　名 (Country)	氏名，現職及び生年月日 Name, Present Post, Date of Birth	勤務先及び自宅住所 (Home & Office Address)	専門研修分野
3	 アルゼンチン Argentine	* Mr. Jorge Alberto Antonio Castilla カスティーラ * Physician, San Roque Hospital サンロケ病院　内科医 * June 22, 1955 (32才)	* Home : Italian °2.843-Va, Cabrera-Cordoba 5000 Argentine * Office: Obispo Salguero n °50 Cordoba-5000 Argentine	心臓血管内科
4	 アルゼンチン Argentine	* Mr. Ruben Osvaldo Padin パディン * Doctor, Surgical Dep. National Hospital Posadas 国立ポサダス病院　外科医 * May 12, 1959 (28才)	* Home : Gual 2481, Buenos Aires 1437 * Office: Martinez de Hoz e Illia, Villa Sarmiento Argentine	心臓血管外科

平成元年度（ 3名 ）

1	 Argentine	* Mr. ANTELO, Carlos Alfredo アンテロ * Chief of Service of Cardio-vascular Surgery of La Plata Children Hospital * May 9, 1948 (41)	* Office: LA PLATA CHILDREN HOSPITAL 14 e/ 65 y 66, La Plata, Argentina * Home : Gallardo 4481, Gonnet, La Plata, Argentina	心臓血管外科

No.	国名 Country	氏名・現職及び生年月日 Name, Present Post, Date of Birth	勤務先及び自宅住所 Home & Office Address	専門研修分野
2	 Argentine	* Mr. TURCO, Emilio Jorge テゥルコ * Assistant M. D. Cardiovascular Surgery, Hospital Interzonal de Agudos Dr. Mariano Castex * December 11, 1948 (40)	* Office: HOSPITAL INTERZONAL DE AGUDOS DR. MARIANO CASTEX Balcarce 900 San Martín (1650), Buenos Aires, Republica Argentina * Home: Lima 2879 3℃ Martínez (1640), Buenos Aires, República Argentina	心臓血管外科
3	 Argentine	* Mr. SCHWINT, Oscar シュイント Antonio * Chief, Pathology Sec. Hospital Institute of Cardiology, H. Pombo Foundation National Academy of Medicine * April 30, 1955 (34)	* Office: HOSPITAL INSTITUTE OF CARDIOLOGY, HERMENEGILDA POMBO DE RODRIGUEZ FOUNDATION NATIONAL ACADEMY OF MEDICINE Coronel Diaz 2423; 1425 Buenos Aires, Argentine * Home: Vidt 2069, 4° "A". 1425 Buenos Aires, Argentine	病理

4. 国別年度別研修員参加実績表

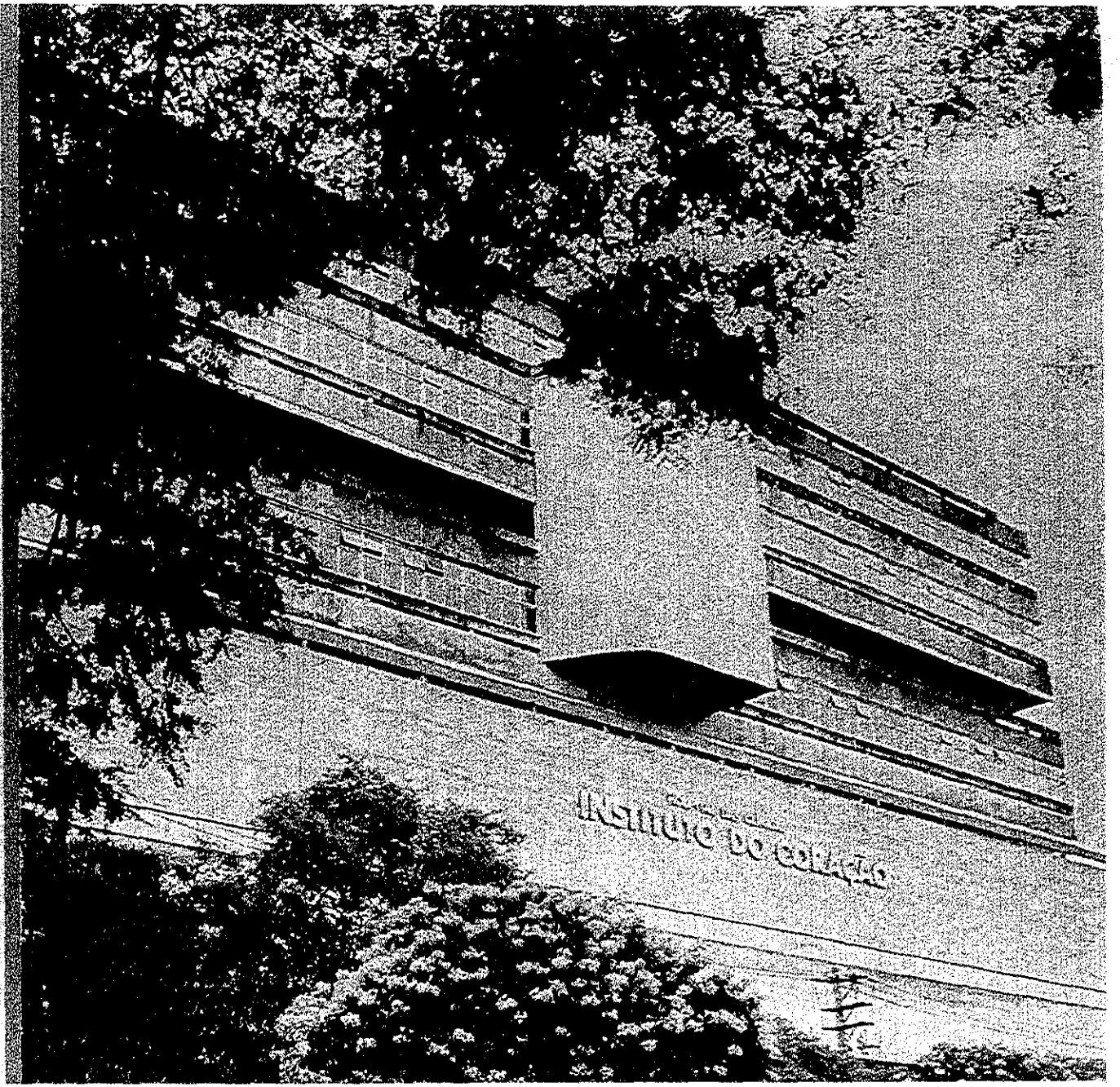
国名 / 年度（昭和・平成）	バングラデシュ	インド	中国	韓国	フィリピン	スリランカ	タイ	ネパール	マレイシア	アルジェリア	エジプト	トルコ	アルゼンティン	ブラジル	ボリビア	コロンビア	コスタ・リカ	パナマ	ウルグァイ	トンガ	合計
57				1			1							2		1					5
58	2				1		1						1	1					1		7
59							1					1	1					1	1		5
60		1					1				1			3					1		7
61	2					1				1			1	2	1		1				9
62	1		1										2					1			5
63		1						1	1					2			1			1	7
1	1	1											3	1			1				7
合計	6	3	1	1	1	1	4	1	1	1	1	1	8	11	1	1	3	2	3	1	52

INCOR

INSTITUTO DO CORAÇÃO

HOSPITAL DAS CLÍNICAS FACULDADE DE MEDICINA USP

Fundação Zerbini



HISTÓRICO

INSTITUTO DO CORAÇÃO — INCOR

A idealização do INCOR ocorreu no início da década de 50 por um grupo de cardiologistas da Santa Casa de Misericórdia de São Paulo, sendo concretizada uma década após, com a união das Disciplinas de Cardiologia e de Cirurgia Torácica da Faculdade de Medicina da Universidade de São Paulo.

Em 24 de dezembro de 1963 foi criado o Instituto do Coração pelo Decreto 42.817, inicialmente denominado Instituto de Doenças Cárdio-Vasculares.

Seu edifício com 11 pavimentos em 31.000 m² de área construída teve sua construção iniciada em 1969 e concluída em 1975, ano de sua fundação.

O Instituto do Coração — INCOR — é uma das unidades do complexo Hospital das Clínicas, da Faculdade de Medicina da Universidade de São Paulo, sendo especializado em Cardiologia Clínica e Cirúrgica. Destaca-se entre os melhores hospitais do gênero no mundo ocupando posição de hospital de excelência e referência no país, por sua linha de atuação dentro dos seguintes objetivos:

- **Assistência:**

Os pacientes portadores de cardiopatias clínicas e cirúrgicas recebem assistência global e integral nas diversas fases da doença.

O objetivo é prevenir, tratar, reabilitar e reintegrar o paciente à sociedade, através de diagnóstico precoce, tratamento ambulatorial, internação, sempre proporcionando assistência por equipe multiprofissional composta por médicos, enfermeiros, psicólogos, nutricionistas, fisioterapêutas, assistentes sociais, odontólogos, farmacêuticos e professores de educação física.

- **Ensino:**

Nesta área o INCOR é campo de estágio para estudantes do 3º e 4º anos da Faculdade de Medicina da Universidade de São Paulo a nível de graduação, para alunos do 6º ano em regime de internato e de cursos de pós-graduação a nível de mestrado e doutorado.

A Residência Médica é oferecida nas áreas de cardiologia clínica, cardiologia pediátrica e cirurgia cardiovascular. São ainda oferecidos cursos em medicina nuclear, métodos diagnósticos não invasivos, terapia intensiva e anatomia patológica e hemodinâmica.

Recebe freqüentemente médicos de diferentes regiões do país e até do exterior para participarem dos programas de especialização.

Os programas de atualização ocorrem durante todo o ano através de módulos das diferentes sub-especialidades em cardiologia.

Foi o INCOR quem constituiu, de forma pioneira, os programas de residência em Enfermagem, Psicologia e Serviço Social Médico.

- **Pesquisa e Desenvolvimento:**

Caracterizam-se por pesquisas básicas e aplicadas nas áreas de cardiologia clínica e cirúrgica, da farmacologia, biofísica e bioquímica e pelo desenvolvimento de tecnologia e técnica especializadas.

- **Administração e Desenvolvimento de Recursos Humanos.**

O INCOR conta com 2.000 funcionários com níveis universitário, técnico e operacional. O corpo clínico é composto por 200 médicos, na sua maioria trabalhando em tempo integral.

A filosofia da Instituição é manter uma política de recursos humanos adequada e compatível com o mercado de profissionais, para que o grau de satisfação do funcionário no exercício de suas funções reflita favoravelmente no atendimento ao paciente.

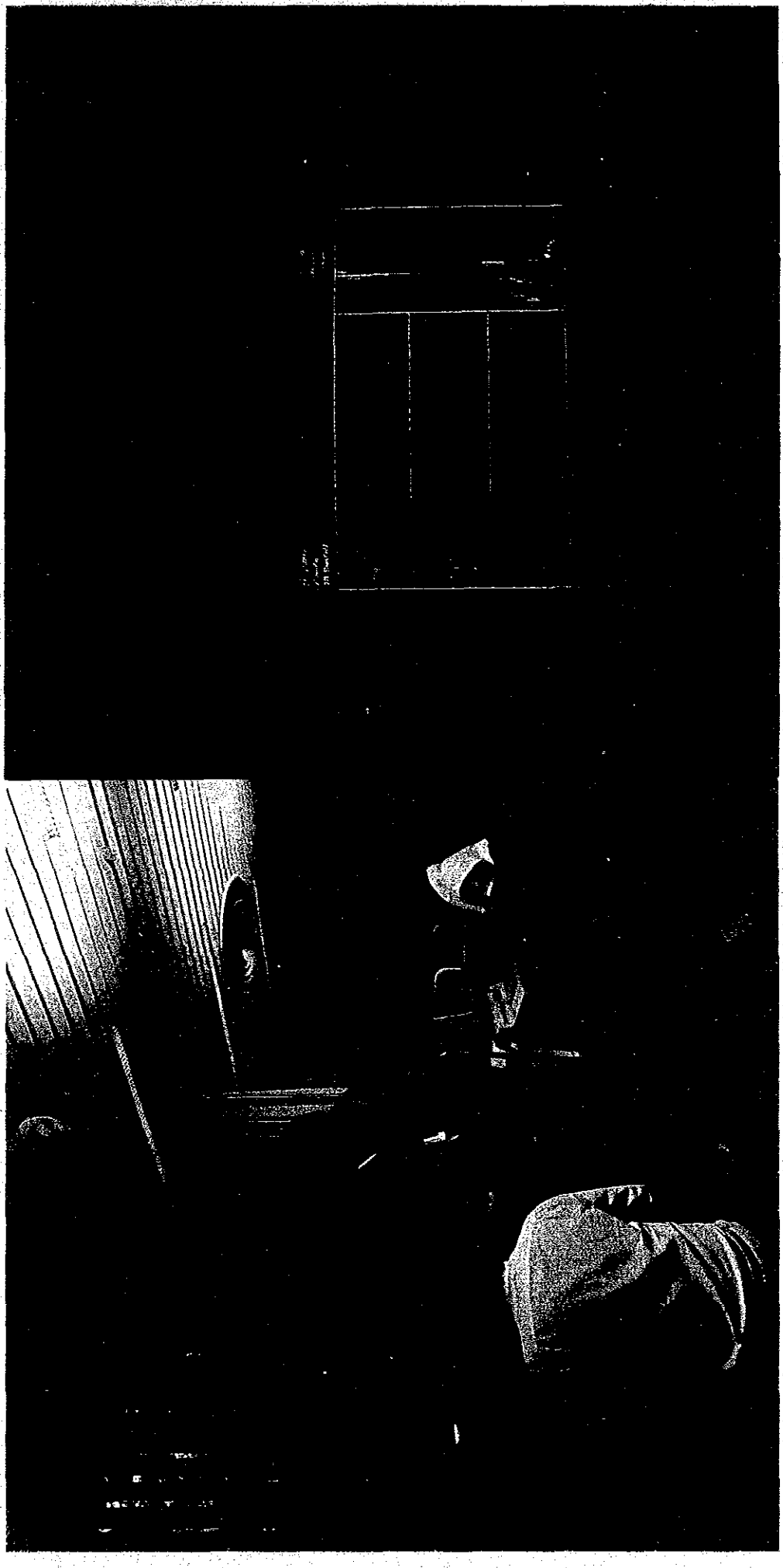
O INCOR oferece diversos benefícios aos funcionários e seus familiares. Existem programas de alimentação, transporte, educação, habitação e financiamento, entre outros.

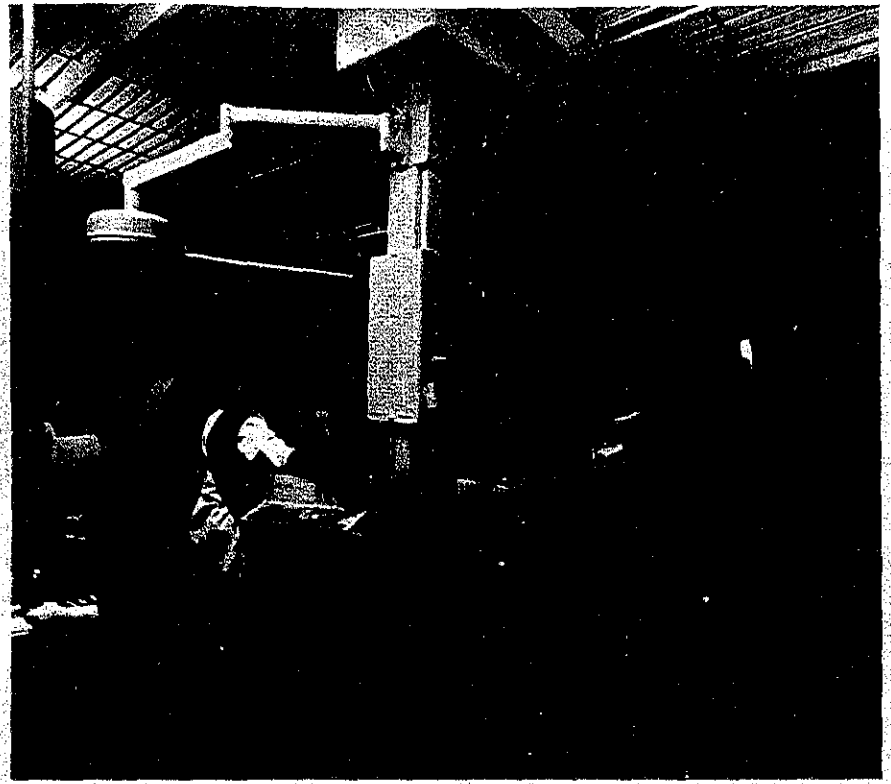
A Área de Treinamento e Desenvolvimento busca a eficiência e a produtividade dos funcionários através de programas de integração, cursos, treinamento e reciclagem. Atua também no desenvolvimento de recursos humanos na área da saúde, oferecendo programas de aprimoramento, estágios e coordenação de eventos.

Desde 1987 funciona no INCOR a Escola de Auxiliares de Enfermagem Fundação E.J. Zerbini, criada com o objetivo de formar profissionais tanto para o Complexo HC como para a comunidade externa.

Com aulas ministradas por profissionais da Instituição e estágios, na sua maioria, no próprio INCOR, a Escola também é um centro formador de técnicos de diversas áreas, tais como técnicos de enfermagem, de métodos gráficos e de instrumentadores cirúrgicos.

- Diretor Geral:
  Prof. Dr. Fulvio Pileggi
- Diretor Cirúrgico:
  Prof. Dr. Adib Jatene
- Diretor Clínico:
  Prof. Dr. Fulvio Pileggi





HEMODINÂMICA

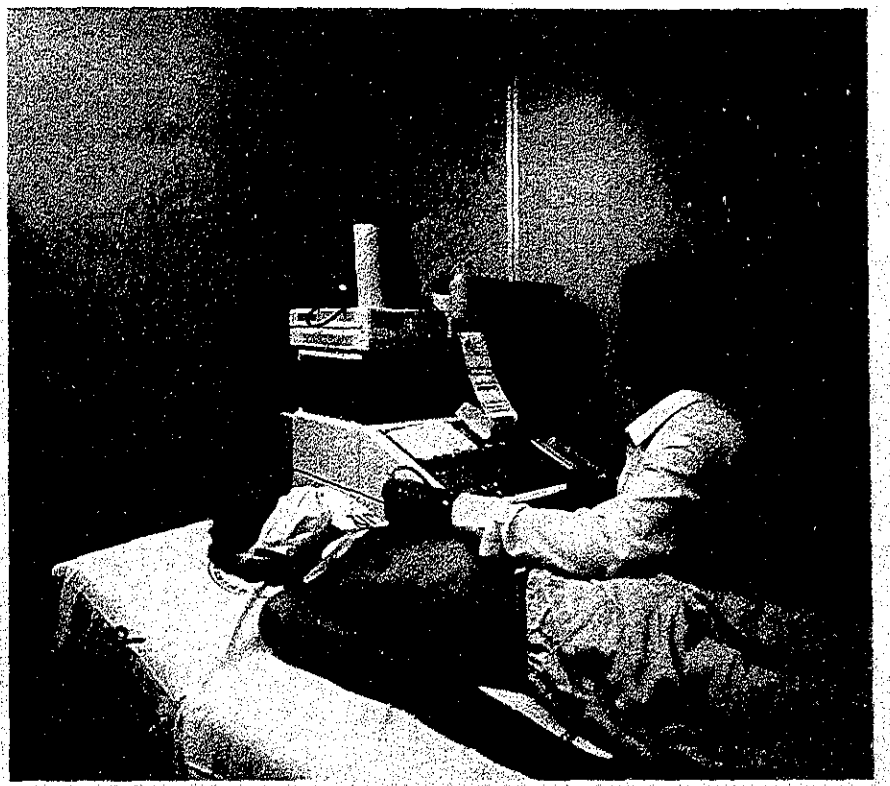
Neste serviço são realizados estudos de cineangiocardiografia e cinecoronariografia, que fazem o diagnóstico de obstruções coronárias, lesões de válvulas e tumores cardíacos, utilizando-se recursos análogos aos do cinema, permitindo o estudo foto por foto.

Estudam-se também crianças portadoras de malformação cardíaca congênita e recém-nascidas, além de procedimentos terapêuticos como angioplastia, valvuloplastia e colocação de marcapasso.

Realizam-se também biópsias do miocárdio e estudo eletrofisiológico, num total de mais de 40 procedimentos diários.

O serviço dispõe de seis salas equipadas com Raio-X acoplados, permitindo a visualização simultânea do coração em dois ângulos. Nelas são realizadas as Angioplastias coronárias. Esta técnica consiste em dilatar por meio de balões uma artéria obstruída por uma lesão.

Atualmente realizam-se estudos angioscópios das coronárias, através de um sistema de fibras ópticas que permitem a visualização das lesões. Futuramente esta técnica possibilitará a destruição das lesões por meio de raio laser.



ELETROCARDIOGRAMA DE ESFORÇO

Importante meio de diagnóstico e de avaliação clínica para portadores de moléstias cárdio-vasculares. É padronizado, utilizando bicicletas ergométricas ou esteiras rolantes, onde o paciente é ligado a aparelhos registradores através de eletrodos. Permite detectar alterações de função do músculo cardíaco e alterações anatômicas do coração.

Quando seus resultados são comparados com resultados de outros tipos de exames como a cintilografia miocárdica — exame realizado com isótopos radioativos — neste caso o Tálio 201 assegura maior precisão, na localização e dimensionamento das regiões onde há deficiência de irrigação sangüínea.

ECOCARDIOGRAFIA

É um método diagnóstico não invasivo e inócuo ao paciente, utilizando o ultra-som.

Permite uma avaliação altamente precisa de alterações de funcionamento e também da anatomia do coração e vasos sangüíneos ocasionados por doenças cardiovasculares. Utiliza-se do efeito Doppler.

A avançada tecnologia utilizada pelo INCOR permite a realização de cerca de 100 ecocardiogramas por dia, em adultos e crianças, ecocardiografia intraoperatória e aplicação do ecocardiograma em pesquisas experimentais. Esta técnica permite até mesmo a análise do coração do feto no interior do útero materno.

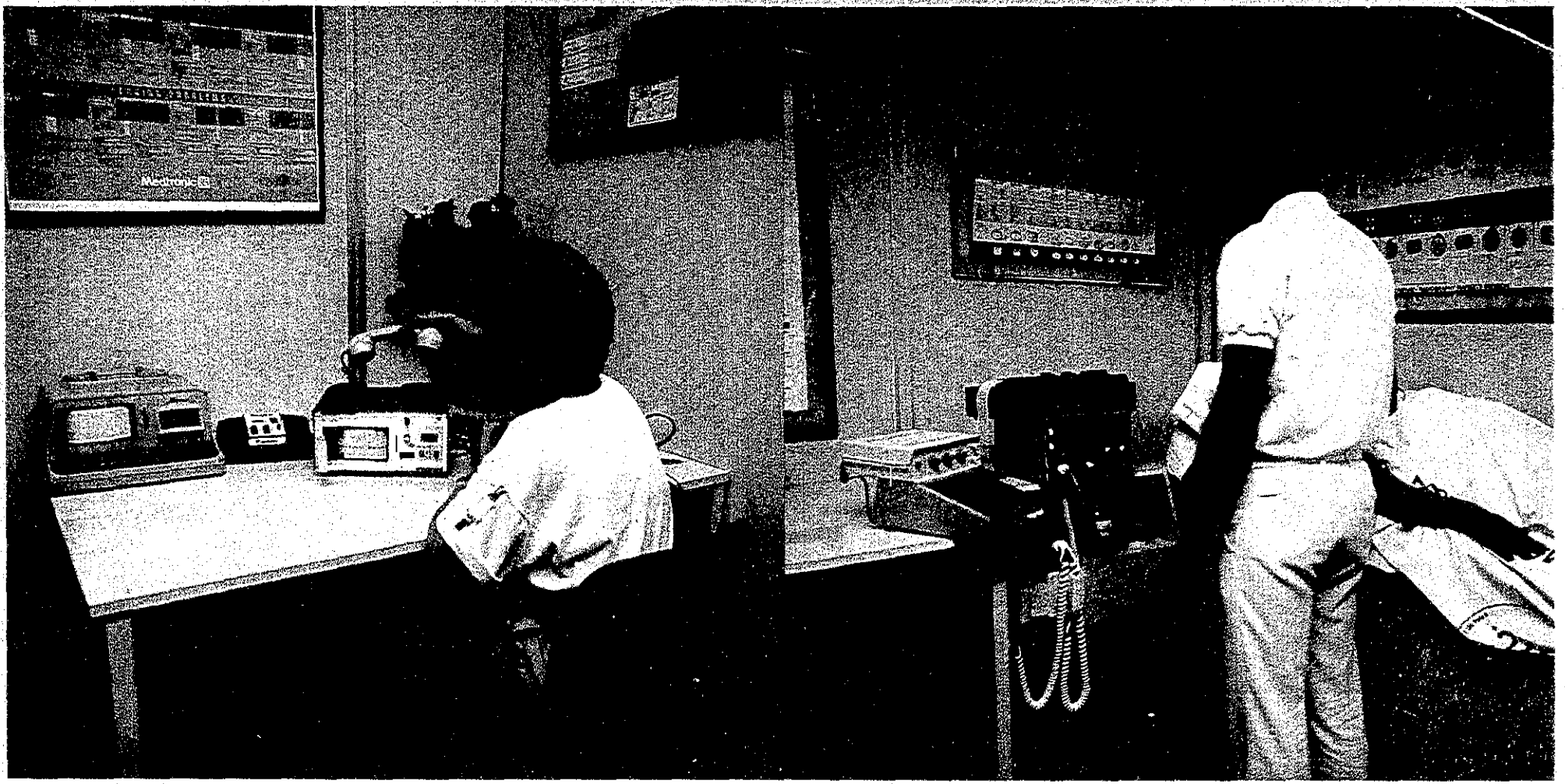
UNIDADE DE AVALIAÇÃO DE MARCAPASSOS

É onde se realiza controle de marcapassos cardíacos e avaliação clínica de seu portador.

Os candidatos a implante destes aparelhos também são submetidos a exames complementares nesta unidade para se definir a necessidade do implante.

As avaliações eletrônicas são realizadas em períodos programados conforme o modelo do aparelho.

Todos os procedimentos realizados são arquivados em banco de dados próprio, capaz de fornecer informações seqüenciais seletivas dessas próteses de maneira ágil e rápida.



SERVIÇOS DE RADIOISÓTOPOS

A Medicina Nuclear caracteriza-se por ser um método inócuo e não invasivo, que se fundamenta na administração de isótopos radioativos ao paciente, e permite a avaliação de vários órgãos e sistemas do organismo do ponto de vista anatômico, funcional e metabólico.

Utiliza-se uma Câmara de cintilação, acoplada a um computador, que capta a radiação emanada do órgão em estudo e a transforma em imagens.

O Serviço de Radioisótopos do INCOR é também um centro de treinamento de especialistas em medicina nuclear. Conta com quatro câmaras de cintilações e computadores de última geração, sendo uma tomográfica e uma móvel, e três computadores que realizam em média 30 exames por dia. Um destes aparelhos é portátil, permitindo a realização de exames à beira do leito, beneficiando pacientes em terapia intensiva.

Além de prestar serviços ao INCOR presta também serviços a todo o Complexo HC e para pacientes externos.