Teaching Cardiology to Undergraduate Students

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Modern cardiology is based on knowledge derived from several disciplines: Anatomy and embryology, physiology, pathology and bacteriology, pharmacology, physics, roentgenology, physical diagnosis, comparative biology, general medicine and surgery, pediatrics, and therapeutics. Psychiatry in all its aspects, public health, industrial organization, and social service, have multiple problems in common with cardiology. This strict connection between cardiology and allied or parent sciences is demonstrated by a few examples: Conduction disturbances (anatomy); complex malformations of the heart (embryology); rheumatic fever (bacteriology, immunology, preventive medicine); neurocirculatory asthenia (psychiatry).

Teaching of cardiology cannot be entirely separated from any of these various contributory disciplines and it could be said that cardiology cuts transversely through all the above mentioned fields.

Teaching of several aspects of cardiology can be done in the respective departments following agreements between the program director and the various chairmen. This applies to anatomy, embryology, bacteriology and pathology, biology, psychiatry, physics, physical diagnosis, and surgery.

Certain basic data of cardiology can still be taught in the respective departments but should be integrated by additional lectures given by the program director or his co-workers. This applies chiefly to physiology, pharmacology, roentgenology, public health, and pediatrics. In our school, two lectures of physiology (the electrocardiogram, the heart sounds); two of pharmacology (digitalis bodies; quinidine and other drugs); two of pediatrics (congenital heart diseases); and one of public health (prevention of cardiovascular diseases) are given by the program director within the frameworks of other courses.

Other aspects of cardiology, which are usually part of the course of medicine, are so basic that they should be taught entirely by the teachers of cardiology. Twelve lectures of didactic medicine dealing with the various cardiovascular diseases, 12 lectures of elementary electrocardiology, 24 cardiac seminars, 24 cardiac clinics, and two pediatric seminars, serve this purpose. A 12-lecture elective course of advanced cardiology completes the specific knowledge of the students.

Additional clinical lectures are given by various instructors of medicine, and clinical pathological conferences are given by instructors of pathology, according to the clinical material.

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The general structure of cardiology teaching is shown in Table I.

### Table I: Lectures Given by Cardiology Staff

<table>
<thead>
<tr>
<th>Year</th>
<th>Introductory</th>
<th>Theoretical</th>
<th>Practical or Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2-seminars</td>
<td>12-didactic medicine</td>
<td>2-physiology (lab.)</td>
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<tr>
<td></td>
<td>2-pharmacology</td>
<td>2-didactic pediatrics</td>
<td></td>
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<tr>
<td>Second</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>12-electrocardiography**</td>
<td>12-cardiology (clinical cases)**</td>
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<tr>
<td>Third</td>
<td>1-public health**</td>
<td>2-4 CPC* **</td>
<td>2-pediatrics (seminars)****</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Fourth</td>
<td>12-advanced cardiology**</td>
<td>24-cardiology** (seminars)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24-cardiology** (clinics)</td>
</tr>
</tbody>
</table>

*Staff takes part in discussion.

**Given two or more times to groups of students.

Various trends in the teaching of cardiology are revealed by the way it is considered by the Academic Staff and the school authorities.

(a) Cardiology is part of medicine. There is no need for separate teachers or specialized courses. The latter would tend to create specialists instead of general practitioners.

(b) Cardiology is part of the teaching of chest disease within or without the courses of medicine. The various diseases of the heart, lungs, mediastinum, and vessels, are taught by the same instructors.

(c) Cardiology is a subdivision of medicine which should be taught within the course of medicine by different teachers. Cardiology teaching is supported by a division of cardiology which is connected with the teaching hospital and is a section of the department of medicine of the school.

(d) Cardiology is a separate discipline which cuts across the others. It should be taught by special teachers, in a separate department of cardiology.

The first statement corresponds to a viewpoint which was correct at the beginning of the century but which is definitely obsolete now. The second statement couples two different kinds of specialties (heart and lungs) which, even if they have multiple points in common, should be kept separate from a didactic and practical point of view.

Cardiology is part of physiology, pharmacology, pathology, or medicine according to the emphasis given to some of its aspects for elementary teaching. It is neither of them as soon as its more advanced aspects are reached, like electrocardiography or its refinements, other graphic methods including phonocardiography, electrokymography and ballistocardiography, catheterization of the heart, and angiocardiology. These technical branches and, most important, their correlation with the clinical data, can be presented by specialists only. These specialists illustrate the most
elementary aspects to undergraduate students while the highest refinements should be left for postgraduate teaching.

Either of the trends listed as (c) and (d) can be accepted according to the conditions of the school; these include financial support, availability of trained and skilled personnel, possibility of overcoming older traditions and personal jealousies, and general progressive trend of the school authorities. Either of them can be made to work.* It should not be forgotten that, while certain refinements of cardiology require discussion by specialists, others can and should be presented by internists or even by practitioners. Thus, statement (a) can be reconciled with statement (c) if both aspects of teaching are developed and presented, side by side, to the student body.

It is the opinion of the writer that a separate department of cardiology, working in close collaboration with the departments of physiology, roentgenology, and medicine, is the best solution. Such a department should include:

(a) experimental section and animal surgery;
(b) laboratory of clinical electrocardiology;
(c) laboratory of graphic studies;
(d) laboratory of catheterization and angiocardiography;
(e) clinical ward;
(f) out-patient department (cardiac clinics).

It is likely that a perfect solution can be found only in schools having a teaching hospital where teaching comes first and cannot be subordinated to other considerations.

Conclusions

Cardiology should be considered from three separate points of view:
(a) As part of various basic sciences or other independent disciplines.
(b) As part of medicine.
(c) As a specialty in itself.

All three aspects should be taken into consideration in the planning of undergraduate teaching because omission of any of them would lead to incomplete, obsolete, or specialized knowledge.

*In our School, trend (c) is now followed, while chairs of Cardiology have been recently established in Georgia.