

В общем надо согласиться с Максимовым, который уже в 1902 г. обратил внимание на значительную дифференциацию и ограниченную пролиферативную потенцию в обыкновенном периферическом эндотелии сосудов. Витальная окраска тканевых культур обнаруживает то же ясное распределение сосудистого эндотелия на две биологические категории (Максимов и др.).

И при патологических обстоятельствах подобное распределение различных капиллярных и пост-капиллярных сосудистых областей нередко обнаруживается с достаточной ясностью, в особенности при известных расстройствах обмена веществ и инфекционных болезнях. Эндотелиальные клетки одной категории (гистиоцитарные береговые клетки) проявляют при этом нередко оживленную и разнообразную активность: фагоцитоз, пролиферация, вероятно, и образование антител; в то же время эндотелиальные клетки другой группы (фиброцитарные береговые клетки) являются в общем более пассивными.

Способность обыкновенного сосудистого эндотелия реагировать на различные патологические раздражения нередко, повидимому, недооценивается. При общих инфекционных заболеваниях и при местном воспалении мелкие сосуды, смотря по обстоятельствам, фактически подвергаются морфологическим изменениям, которые можно рассматривать, как защитные приспособления (некоторые *colitis* тифозные инфекции, *sepsis lenta* и т. д.). Из этого видно, что обе эти биологические категории береговых клеток не так уже резко разграничены друг от друга, как это предполагают Aschoff, Максимов и др.

Особенный интерес в этом отношении представляет поведение сосудистого эндотелия грануляционной ткани. Примитивная эмбриональная природа этой ткани отражается также на строении и реакции ее сосудов. Подобно тому, как клетки стромы грануляционной ткани имеют большое сходство с активными фиброцитами и гистиоцитами, так и ее сосудистый эндотелий очень близок к гистиоцитарным береговым клеткам. Особенно красиво выступает своеобразие этого молодого эндотелия в некоторых формах специфического воспаления, прежде всего туберкулеза; антибактериальная реакция обуславливает нередко резко выраженное образование туберкулов внутри сосудов (автор). При витальной окраске грануляционной ткани Mc Junkin наблюдал ясный фагоцитоз в сосудистом эндотелии. Следовательно, грануляционная ткань очень живо напоминает во многих отношениях ту активную мезенхимую, которую мы называем макрофажной или ретикуло-эндотелиальной системой.

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Electrocardiography of 10000 Patients at the Massachusetts General Hospital from 1914 to 1931.

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Professor Samojlow's keen interest in electrocardiography and his contributions in this field have made us feel that he would have been pleased to have a record of our own practical experience in the use of the electrocardiograph in the Cardiac Clinic at the Massachusetts General Hospital in Boston. Hence we are sending herewith in memory of Professor Samojlow a survey of our electrocardiographic findings during the last 16 years (1914—1931) ever since the installation of Einthoven's string galvanometer in our laboratory. On several occasions during the past few years Professor Samojlow himself has visited this laboratory and has shown an interest in our records. We realize that in his death we have lost a personal friend and a helpful associate.

Altogether 20,413 electrocardiograms have been obtained from 10000 subjects in routine and research studies at the Massachusetts Ge-

neral Hospital from October 21, 1914 to March 13, 1931. Almost all of these subjects have been patients seen both in public hospital and in private practice. The electrocardiographic diagnoses in the order of frequency are tabulated as follows:

<i>Total of 10000 subjects</i>	<i>Total number</i>	<i>Percentage</i>
1) <i>Abnormal axis deviation</i>	2,775	27.75
a) Left	2,013	20.13
b) Right	762	7.62
Congenital dextrocardia	14	0.14
c) Abnormally large auricular (P) waves	472	4.72
2) <i>Premature beats</i>	1,503	15.03
a) Ventricular	974	9.74
b) Auricular	512	5.12
c) Auriculoventricular nodal	17	0.17
3) <i>Auricular fibrillation and flutter</i>		
a) Auricular fibrillation	1,422	14.22
b) Auricular flutter (including 19 «impure» cases)	104	1.04
4) <i>Heart-block</i>	1,410	14.10
a) Intraventricular	726	7.26
I) Slight aberration (slurring) of the Q-R-S waves	353	3.53
II) Partial intraventricular block of moderate grade	158	1.58
III) Left bundle branch block*	189	1.89
IV) Right bundle branch block*	34	0.34
b) Auriculoventricular	641	6.41
I) Slight partial A - V block (long P-R interval)	296	2.96
II) Partial A-V block of moderate grade	266	2.66
III) Complete A-V block	79	0.79
c) Sinoauricular block (not standstill)	43	0.43
5) <i>Tachycardia</i>		
c) Sinoauricular (rate of 110 or more per minute)	1,177	11.77
b) Paroxysmal	98	0.98
I) Auricular	80	0.80
II) Ventricular	14	0.14
III) Auriculoventricular nodal	4	0.04
6) <i>Sinus arrhythmia and bradycardia</i>		
a) Marked sinus arrhythmia	369	3.69
b) Marked sinoauricular bradycardia	186	1.86
c) Sinoauricular block (not standstill)	43	0.43
d) Auricular standstill	18	0.18

* These designations follow the newer interpretations set forth by Wilson (F. N.) and by Oppenheimer (B. S.) and their associates. The terms left and right could be reversed following the old interpretations.

7) Auriculoventricular nodal rhythm	14	0.14
8) Acute coronary thrombosis <i>T</i> wave	260 **)	2.60
9) Low voltage (potential) of all waves	269	2.69

1. Abnormal axis deviation.

The commonest electrocardiographic abnormality was an abnormal degree of axis deviation not associated with bundle branch block (2,775 cases or 27.75 per cent); the commonest type of this abnormality was left axis deviation (2013 cases or 20.13 per cent) such as accompanied many enlarged hearts whether hypertension, coronary disease, or aortic valve disease was to blame. Not all enlarged hearts, however, show abnormal axis deviation, either left or right; this is especially true when both ventricles are enlarged.

Abnormal right axis deviation, indicating preponderant enlargement of the right ventricle, was only about one-third as common (762 cases or 7.62 per cent) as abnormal left axis deviation and was as a rule due either to mitral stenosis, to congenital heart disease, or to pulmonary heart disease (the *cor pulmonale*).

One special variety of abnormal right axis deviation, namely that caused by congenital dextrocardia, as proved by the total inversion of Lead 1, was rare. A total of 14 cases (0.14 per cent) was encountered, or about one case a year.

Other unusual positions of the heart in the chest are only rarely the cause of any high degree of abnormal axis deviation, either right or left; we have found by and large that the electrocardiographic evidence of ventricular preponderance is a helpful clinical sign in spite of occasional exceptions. Certainly it is more useful than roentgen ray evidence of ventricular preponderance.

Auricular enlargement was almost always present in the large number of cases (472 or 4.72 per cent) showing abnormally large auricular or *P* waves (most prominent in Lead 1 or Lead 2). Mitral stenosis was generally responsible but in some cases chronic hyperpiesia with left ventricular failure and secondary effect on the auricles, overactivity of the auricles (due to sympathetic stimulation), or congenital heart disease (usually pulmonary stenosis) was the factor behind the auricular enlargement. Congenital pulmonary valve stenosis, though not a common cause, was always attended by enlarged *P* waves in the electrocardiogram.

2. Premature beats (extrasystoles).

Of the disturbances of rhythm that were most commonly recorded was the premature beat or extrasystole (1,503 cases or 15.03 per cent). This finding was to be expected but the surprising thing is that its frequency, taking into account the fact that in occasional cases both auricular and ventricular premature beats were found in the same case, was about the same as that of auricular fibrillation. The reasons for this are two: in the first place, among patients auricular fibrillation is almost as common as the premature beat while among normal healthy

**) Thirteen instances found in 1000 records, which would mean about 260 in 20000 electrocardiograms of 10000 cases.

individuals relatively few of whom were studied in this entire series the premature beat is common while auricular fibrillation is rare; and secondly, premature beats may be present in a given case one day, hour, or minute, and not at another at the time the electrocardiogram happens to be taken.

The relative frequency of ventricular premature beats to auricular premature beats was about 2 to 1 (974 cases or 9.74 per cent of the former to 512 or 5.12 per cent of the latter). Premature beats which could be identified as arising in the auriculoventricular junctional tissue were rare (17 cases or 0.17 per cent).

3. Auricular fibrillation and flutter.

Auricular fibrillation was a surprisingly common clinical disorder, being recorded in 1,422 cases (14.22 per cent of the total series).

Similar in mechanism to auricular fibrillation is auricular flutter but this disturbance of rhythm is relatively rare. It was found in only 104 cases (1.04 per cent), 19 of which were of the «impure» or «flutter-fibrillation» type, leaving only 85 «pure» cases (0.85 per cent), or in relation to auricular fibrillation only 1 to 16.73.

4. Heart-block.

Heart-block of various kinds was common, there being a total of 1,410 cases, a few of them duplicated because of the occasional coincidence of auriculoventricular and intraventricular block in the same cases.

Intraventricular block was found somewhat more frequently than auriculoventricular block; it was recorded in a total of 726 cases (7.26 per cent), being of slight degree in 353 (3.5 per cent), of moderate degree in 158 (1.58 per cent), and of marked degree in 222 (2.22 per cent). Of those of marked degree left bundle branch block (according to the new nomenclature) was much more common than right bundle branch block, in the ratio of about 6 to 1; there were 189 (1.89 per cent) of the former and only 34 (0.34 per cent) of the latter.

There were 641 cases (6.41 per cent) of auriculoventricular block of all grades, 296 (2.96 per cent) being of slight degree, consisting of delayed conduction (long *P-R* interval) alone, 266 (2.66 per cent) showing dropped beats or 2 to 1 or 3 to 1 block, and 79 (0.8 per cent) showing complete block. The cases showing the higher grades of block and many of those showing lesser grades were individuals with important cardiac involvement as a rule. Transient infections, toxic effects (as from digitalis), and perhaps nervous influences were common causes of slight prolongation of the *P-R* interval beyond the normal.

Sinoauricular block was rare, being found in only 43 cases (0.43 per cent). It was generally of little but academic interest.

5. Tachycardia.

Very fast heart rates (over 110 per minute) arising in the normal pacemaker were common, 1,177 cases (11.77 per cent), while very slow sinoauricular rates (less than 50 per minute) were much less frequent, 186 cases (1.86 per cent). They were both as a rule simply functional conditions dependent on nervous or toxic factors.

Paroxysmal tachycardia is really much more common than is indicated by the statistics in our series since it is only occasionally that

records can be taken during the actual paroxysms, whether in normal people, who have this disturbed rhythm quite frequently, or in sick people. We obtained electrocardiograms showing paroxysmal tachycardia of all kinds in 98 cases (0.98 per cent); auricular paroxysmal tachycardia was present in 80 cases (0.8 per cent), and ventricular paroxysms in only 14 (0.14 per cent), a ratio of about 6 to 1. The ventricular paroxysms were almost always found in very ill patients and were generally a bad prognostic sign while the auricular paroxysms were of little importance except to cause discomfort. Paroxysms of tachycardia arising apparently in the auriculoventricular node or bundle were very rare (4 cases or 0.04 per cent).

6. Sinus arrhythmia and bradycardia.

Sinus arrhythmia of abnormal degree was found in 369 cases (3.69 per cent) and marked sinoauricular bradycardia in 186 cases (1.86 per cent). Depression of the sinoauricular node sufficient to produce dropped sinoauricular beats (sinoauricular block) occurred in only 43 cases (0.43 per cent) and to cause complete auricular standstill in only 18 cases (0.18 per cent).

7. Auriculoventricular nodal rhythm.

In 14 cases (0.14 per cent) the rare auriculoventricular nodal rhythm was found, the pacemaker in the lower node controlling both auricles and ventricles, the latter usually contracting first. Thus rhythm was largely of academic interest only.

8. Abnormal T waves.

Many cases showed various abnormalities of the *T* waves, most of them diphasic waves beginning with inversion of the *S-T* intervals due to digitalis. Otherwise flat, inverted, or high origin *T* waves were found mostly in myocardial disease, largely of coronary origin. The typical Pardee sign (high origin of *T* wave with inversion following, in any lead), found in acute coronary thrombosis, was noted in marked degree in only 13 of 1000 records. On the basis of this figure, a total of about 260 would be the estimate for the 1000 patients. Many patients with acute coronary thrombosis are sick in bed at home and too ill to move to the hospital where the series of electrocardiograms now being analyzed was obtained. In a number of other cases we have obtained electrocardiograms showing this phenomenon by using a portable galvanometer in the patient's home. Numerous lesser grades of the «acute coronary *T* wave» have been observed but often of such slight grade as to be doubtful.

9. Low voltage.

Finally low voltage or amplitude (less than 5 millimeters of all complexes in all leads) was not at all rare, being found in 269 cases (2.69 per cent). It was almost invariably the result of serious myocardial disease or of hypothyroidism. A few instances occurred with pericardial effusions, extensive anasarca, and in otherwise normal individuals.