TREATMENT IN GENERAL PRACTICE

This article is one of a series on the management of some of the major medical disorders met with in general practice.

TREATMENT OF PAROXYSMAL TACHYCARDIA

BY

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The subject to be considered is rapid heart action which occurs in paroxysms. It must not be confused with the rapid heart rate which is associated with exercise, febrile states, hyperthyroidism, or ordinary cardiac weakness. The paroxysms begin abruptly and terminate abruptly, though the heart may not immediately assume the normal slow rate of beating, especially if the paroxysm has been prolonged. The duration of an attack varies from a few rapid beats to an hour, or even to several days, while the rate varies in different cases from 120 to 250 per minute, but is usually between 150 and 200. The symptoms likewise vary—from a feeling of discomfort or fluttering in the chest, neck, or upper abdomen, to extreme cardiac distress or failure—depending on the duration of the attack and the functional efficiency of the heart muscle. This is the more readily understood when one realizes that paroxysmal tachycardia may occur in a heart which is perfectly healthy or in one which is already the seat of grave disease.

These features apply to paroxysmal tachycardia in general, but when one considers the nature of the disorder different types can be recognized. All are due to a pathological impulse formation in the heart; in all the impulse that initiates the paroxysm arises elsewhere than in the normal pacemaker or sino-auricular node.

Simple Paroxysmal Tachycardia

In the group included under this title the impulse that starts the attack probably originates in a single focus in the auricle, auriculo-ventricular node, or ventricle, and we may define the case as one of simple paroxysmal tachycardia of auricular or of nodal or of ventricular origin, as the case may be. The same focus may at other times produce isolated premature beats or extrasystoles, and the paroxysm is essentially a series of consecutive extrasystoles with no normal beats intervening. The rhythm is perfectly regular, and, the focus of origin being outside the normal direct control of the sympathetic or vagus nerves, the rate is not appreciably influenced by posture or exercise. At the bedside it is usually impossible to differentiate these three types, and even instrumental methods at times fail. They most commonly occur in early middle life.

In other cases the paroxysms are of a more complicated nature, and are identical with the conditions more commonly recognized in a persistent form as auricular flutter and auricular fibrillation. When producing paroxysmal tachycardia, they ought to be differentiated by the names "paroxysmal auricular flutter" and "paroxysmal auricular fibrillation."

Paroxysmal Auricular Flutter

In this condition, if the auricle is beating at a regular rate of, say, 280 or 300 per minute, the ventricle usually responds to every second beat, and will therefore have a

regular rate of 140 or 150. Paroxysmal auricular flutter with a 2 to 1 response will therefore be indistinguishable at the bedside in most cases from simple paroxysmal tachycardia, though the rate is often somewhat slower and the patient older. (Less commonly the ventricle may respond to every fourth beat and have a regular rate of 70 or 75, a condition difficult to recognize as one of paroxysmal flutter without instrumental aid.)

Paroxysmal Auricular Fibrillation

In this, as in the common permanent variety, the heart beats are always irregular in force and in time, and the rate is usually rapid, frequently being between 140 and 190 per minute. The only feature distinguishing it from the ordinary case of auricular fibrillation is the abrupt onset and abrupt termination of the attack.

Five varieties of paroxysmal tachycardia can thus be recognized—namely: simple paroxysmal tachycardia of auricular origin; simple paroxysmal tachycardia of nodal origin; simple paroxysmal tachycardia of ventricular origin; paroxysmal auricular flutter; paroxysmal auricular fibrillation. Treatment resolves itself into (1) an attempt to stop the paroxysm which is in progress, and (2) an attempt to ward off or lessen the frequency of the attacks.

To Stop the Paroxysm

Occasionally a paroxysm can be stopped by one of the following methods, though none is certain in any one case.

The patient should take a drink of ice-cold water, or a teaspoonful of aromatic spirits of ammonia, or a tablespoonful of undiluted whisky. The effect is probably produced reflexly, as, when successful, recovery is obtained much too rapidly for absorption to have taken place. A carminative mixture may similarly prove of value—for example:

R.	Tinct. capsici	...	...	...	...	m v
	Spt. ammon. aromat.	...	...	...	...	m xxx
	Tinct. card. co.	...	...	...	...	m xxx
	Aq. menth. pip.	...	...	...	...	ad 3 j

Heavy pressure over the carotid artery in the upper part of the neck **may be effective**; it should be maintained for about a quarter of a minute, and each side in turn should be tried if necessary. Pressure on the eyeballs, sufficiently heavy to produce pain, may also cause cessation of the paroxysm. Holding the breath sufficiently long to bring about a feeling of fullness in the head, or bending the body with the head between the knees, may also arrest the attack. Either method may produce a feeling of faintness. Extreme heat or cold to the praecordium is sometimes useful, and may be applied as a hot fomentation, sinapism, or ice-bag.

If the attack is not aborted by any of these methods, treatment by quinidine sulphate, or by some preparation of the digitalis group, should be instituted. The doses suggested are for a patient between 8 st. and 10 st., and are based on the assumption that the patient has not been having a digitalis or strophanthus* preparation during the

* In place of strophanthin, where recommended above, one may use Burroughs Wellcome and Co.'s hypoloid digoxin. As an initial dose 1 c.cm. containing 0.5 mg. digoxin diluted to 10 c.cm. with sterile normal saline should be injected intravenously with great care, so that none escapes into the surrounding tissues. It may also be taken orally in a dose of 1 mg., diluted with water.

previous ten days. It is convenient to remember that, in most cases, for a therapeutic result to be produced, the patient requires to have in his body at one time approximately half a drachm of digitalis tincture per stone of body weight, and that about 20 minims are excreted daily. Tincture of digitalis is best prescribed pure, and should be diluted with water immediately before being taken. It should be accurately measured in a minim glass, and never ordered as so many drops.

In simple paroxysmal tachycardia of auricular or nodal origin strophanthin may first be used. If the patient has not previously been getting digitalis or strophanthus, 1/100 grain of strophanthin may be injected intravenously. If in two hours no effect has been produced, 3 grains of quinidine sulphate in capsule should be taken as a testing dose. If no untoward result follows, 6 grains should be given in two hours, and repeated every three hours up to five doses if necessary.

In simple paroxysmal tachycardia of ventricular origin quinidine sulphate should be prescribed as above. It is usually more satisfactory than digitalis or strophanthin.

In paroxysmal auricular flutter digitalis or strophanthin should first be employed. As it is important to obtain an effect from the drug as speedily as possible large doses should be used, and the patient must be kept under close observation. To begin with, 2 drachms of the standardized tincture of digitalis should be given, followed in six hours by 1 drachm, and then by 30 minims at six-hourly intervals, the heart rate at the apex being noted before each subsequent dose is taken. The heart rate will become slower. When it reaches 80 or 70, and in the absence of toxic symptoms—for example, vomiting or diarrhoea—the drug should be cautiously continued till the heart becomes irregular, due to fibrillation. If the drug is stopped at this stage normal rhythm is frequently restored. A similar result may be obtained by strophanthin. One dose of 1/100 grain should be prescribed at the commencement, and then at eight-hourly intervals 1/250 grain, till the rate becomes slow and irregular. Quinidine as employed in simple paroxysmal tachycardia may also be tried, but it is not so useful, and is not without risk.

In paroxysmal auricular fibrillation, quinidine sulphate, as for simple paroxysmal tachycardia, is to be preferred. Occasionally 1/100 grain of strophanthin intravenously is attended by a rapid response.

In any case of paroxysmal tachycardia, should pulmonary oedema supervene, prompt administration of morphine 1/6 grain, with atropine 1/100 grain or 1/50 grain, may avert danger.

Prophylactic Treatment

To ward off attacks of paroxysmal tachycardia a knowledge of the aetiology is required, and this is often vague in any individual case. As attacks may apparently be induced by smoking or over-indulgence in coffee or strong tea, these, if found to be exciting causes, should be banned. Flatulent dyspepsia, intestinal stasis, and constipation, if present, should be corrected. A powder containing hydrarg. eum cret. 1/2 grain, pulv. rhei co. 10 grains, and bismuth salicyl. 10 grains, three times a day, should be prescribed, while avoidance of much starchy food in the diet, careful mastication, and rest after meals are helpful. Any toxic focus in the teeth, the throat, the ears, or the genito-urinary system should be appropriately dealt with.

In any case which has responded to quinidine sulphate it is advisable to continue the drug in moderate doses, say 5 grains once or twice daily, more particularly if the paroxysms have been of frequent occurrence. This can be continued without risk for an indefinite period as a prophylactic measure.

GAS ATTACKS IN WAR

DEFENCE OF CIVIL POPULATION

As briefly noted in the *Journal* of June 15th (p. 1230) a lecture was delivered before the British Science Guild on June 12th by Mr. J. DAVIDSON PRATT, one of the experts working on the subject, on the defence of the civilian population against gas attacks in war, and more especially gas attacks from the air.* Lord MELCHETT, the president of the Guild, who was in the chair, declared his opinion that gas was the least efficient weapon for injuring human beings yet devised. It was not nearly as lethal as uninstructed people imagined, though at the same time he fully agreed that the education of the public in its properties and in methods of protection was a vital problem in national defence.

Mr. Pratt, similarly, began by deprecating alarmist statements by persons who had no real scientific knowledge of the subject, and he felt that no penalty was too severe for those who had described luridly, for example, how a bomb dropped on Oxford Circus might spread death and destruction over the whole area from Baker Street to Charing Cross. On the other hand, he evidently felt that no great reliance should be placed on pre-war agreements to prohibit the use of gas. It was the general experience when war came that any pretext was seized upon to justify the tearing up of such "scraps of paper," war itself being the primary anarchy. Moreover, chemical warfare offered great temptations to belligerents because it employed products which either were in everyday use or to the manufacture of which existing chemical plant could easily be adapted. Thus a country with a well-developed air service and a strong chemical industry had the means at hand for a rapidly improvised gas attack on the nerve centres of the enemy.

CHEMICAL ARMAMENT

In gas attacks from the air, said Mr. Pratt, the bombs dropped might be comparatively fragile, breaking up and liberating their poisonous contents on striking the ground, or they might be of stouter construction, requiring an explosive charge to open them. The toxic agents which they carried might act in various ways: gases like phosgene and chloropicrin attacking the lungs; tear gases like ethylchloroacetate and chloroacetophenone affecting the eyes; organic arsenic compounds such as diphenylchloroarsine, diphenylcyanoarsine, and diphenylamine arsenous chloride irritating the breathing passages, and the vesicant or blistering agents burning the skin. Thus protection for the whole body was required against such vesicants as mustard gas and Lewisite, whereas for other types a gas mask protecting lungs and eyes was adequate. Mustard gas and Lewisite were not really gases, but liquids with high boiling points, which could be sprayed from aircraft at practically any height, to fall like rain on the ground below. The physical characteristics of the gases also varied. Some were described as non-persistent gases; the area over which phosgene was liberated, for example, might be free from gas after a comparatively short time, owing to dilution and dissipation by the wind. On the other hand, liquids with high boiling points like mustard gas, when scattered over the ground on the bursting of a bomb, evaporated slowly, contaminating the atmosphere with the vapour, so that the ground and the objects covered were dangerous to touch until evaporation was complete or the liquid had been neutralized, a process which might take days if the contamination had been heavy and the weather conditions were unfavourable to rapid evaporation.

A further complication, of course, was that an enemy, bombarding from the air, was unlikely to restrict his projectiles to gases; high explosive and incendiary bombs would be used at the same time, and the resulting debris would be widely contaminated, and the defence against a persistent gas rendered more difficult. Generally speak-

* Copies of the lecture in full, entitled "Gas Defence," by J. Davidson Pratt, are to be had from the British Science Guild, 6, John Street, Adelphi, W.C.2, at the price of 1s.