THE EFFECT OF AURICULAR FIBRILLATION ON THE OPERATIVE RISK IN HYPERTHYROIDISM.

BY

JENNER HOSKIN, M.D., M.R.C.P.,

ASSISTANT PHYSICIAN AND CARDIOLOGIST, ROYAL FREE HOSPITAL;
CONSULTING CARDIOLOGIST, ST. PAUL'S HOSPITAL FOR
GENITO-URINARY DISEASES.

Auricular fibrillation is the commonest cardiac irregularity found in Graves's disease. It may occur during the acute stage, as in cases of exophthalmic goitre with severe onset, or be found in patients with toxic goitre of many years' history. Its presence is probably due to the intensity of the thyrotoxicosis in the former, and in the latter to cardio-vascular changes which have been gradually brought about by the long-continued poisoning of the abnormal thyroid secretion.

Willius and Boothby¹ consider that the auricular fibrillation depends on the duration rather than on the intensity of the disease; Tinker² is in agreement. Strickland Goodall³ considers that auricular fibrillation is of rare occurrence in pneumo-mechanical hearts, and usually takes some years to develop in thyrotoxic hearts, although it may occasionally occur spontaneously with the onset of the disease.

Auricular fibrillation is at first usually paroxysmal, and is brought about by effort or by excitement; later on the condition becomes permanently established. Its occurrence in Graves's disease is a serious factor in the gravity of this condition, and, if untreated, will lead in a short time to congestive failure. Hamilton⁴ in investigating 50 cases of Graves's disease with congestive failure found auricular fibrillation present in 39. Out of 230 cases of Graves's disease Read⁵ found persistent auricular fibrillation present in 17; in 16 of these there was congestive failure. Dameshek⁶ found 10 cases with permanent fibrillation out of 23 patients having Graves's disease with congestive failure.

Auricular fibrillation is more frequently found in toxic goitres, in which there is usually several years' history of thyroid enlargement with toxic symptoms. One would therefore expect its presence more commonly in patients over the age of 40; in my series 66 per cent. of patients were over this age, the average being 44.3 years. In 75 cases of Graves's disease with auricular fibrillation Phillips and Anderson⁷ found the average age to be 47.

It is my experience that all cases of exophthalmic and toxic goitre of moderate severity will in time reach the stage of auricular fibrillation with congestive failure unless the source of intoxication is removed. There seems every likelihood that a large number of cases of auricular fibrillation found in elderly subjects, and considered to be the result of degenerative myocardial changes, are really the sequels of a past thyrotoxicosis. Lahey and Hamilton⁸ consider that every case of auricular fibrillation should be suspected of hyperthyroidism if there is a discrepancy between the patient's condition, history, and heart findings. Colvin and Smith⁹ find that auricular fibrillation is often the only sign of a thyrotoxic heart, the thyrotoxicosis being missed on account of the smallness of the thyroid gland and the absence of eye signs.

The present paper is the result of my investigation of 356 consecutive cases of Graves's disease, exophthalmic and toxic, in which all but four had operative treatment; 315 were cases of exophthalmic goitre, and 41 of toxic goitre. Thirty cases of auricular fibrillation were found, 22 among the exophthalmic goitre cases and 8 among the toxic. This gives an incidence of 6.98 per cent. and 19.5 per cent. respectively, and a total incidence of 9.52 per cent. Hamilton⁴ found 18 cases of auricular fibrillation out of 200 patients (11 per cent.); Kerr and Henzel¹⁰ detected auricular fibrillation in one-third of their cases, but of these 80 per cent. were paroxysmal. Krumbhaar¹¹ found only 3 out of 51 (5.9 per cent.). Read

had 17 cases of auricular fibrillation among 230 cases of Graves's disease (7.4 per cent.). Goodall, however, found this arrhythmia in 20 per cent. of thyrotoxic hearts; and Willius and Boothby in 377 thyrotoxic cases obtained auricular fibrillation in 22 per cent. of exophthalmic goitres and in 24 per cent. of toxic. It is probable that in my series a certain number of cases with transient auricular fibrillation may have been overlooked; this would make the incidence slightly higher.

Permanent auricular fibrillation is a far more serious complication than is the transient form, although the latter tends to become permanent in course of time if the toxin is not removed. Transient auricular fibrillation occurs not infrequently immediately following partial removal of the thyroid, although it is extremely rare after ligation of the thyroid vessels. It usually lasts a few days only, and may be merely of a few hours' duration. In cases of permanent auricular fibrillation removal of the thyrotoxicosis will often result in the restoration of normal rhythm without the exhibition of any drug.

Dunhill, Fraser, and Stott,¹² recording 15 cases of Graves's disease complicated by auricular fibrillation, 11 being permanent, state that 3 out of the 4 transient cases occurred after operation. They came to the conclusion that auricular fibrillation, if once established, will persist without treatment, and may continue even after the removal of the thyrotoxicosis. Dunhill¹³ in a later paper stated that 80 per cent. of his patients regained normal rhythm after adequate removal of the thyroid. Smith and Colvin⁹ found a return to normal rhythm in 50 per cent. of their cases after operation, the average time taken for this to occur being twenty-five days. Hamilton,⁴ reporting 18 cases with auricular fibrillation, of which 6 were transient, found that in all the transient and in 5 of the permanent normal rhythm was regained after operative treatment.

In my series (Table I) there were 12 transient cases, of which 10 occurred after partial thyroidectomy; in the remainder paroxysmal attacks of auricular fibrillation were noted electro-cardiographically prior to operative treatment. In all 12 cases normal rhythm was re-established within

TABLE I.

	Transient A. F.		Permanent A. F.		Death.
	N.R.	N.C.	N.R.	N.C.	
Exophthalmic goitre with auricular fibrillation					
No operation	—	—	—	2	1
Ligation	2	—	1	1	1
Partial thyroidectomy	5	—	5a	2b	2
Total	7		6	5	4
Toxic goitre with auricular fibrillation					
No operation	—	—	—	1	0
Ligation	—	—	—	—	0
Partial thyroidectomy	5	—	1	1	0
Total	5		1	2	0

N.R. = Normal rhythm.

N.C. = No change.

a = One case auricular fibrillation recurred four months later.

b = One case normal rhythm restored by quinidine.

one week of the operation, without quinidine being administered. Of the 18 cases with permanent fibrillation there were 4 deaths, 3 following operation; one patient's condition was considered too serious for any operative procedure. Of the remaining 14 cases, 7 became normal within a few days of operation, and in 7 the irregularity persisted. Of these 7, 3 were not operated upon, 3 had partial thyroidectomy performed, and in one the superior thyroid vessels were tied. One of those cases in which normal rhythm was restored by partial thyroidectomy relapsed into auricular fibrillation four months later. In

one an irregular rhythm persisted in spite of partial thyroidectomy, but normal rhythm returned after 154 grains of quinidine, and has persisted for two years. Thus of the 11 cases of permanent auricular fibrillation operated on, normal rhythm was restored and remained permanent in 6, whereas in 5 the irregularity persisted; thus restoration of the normal rhythm occurred in 55 per cent.

Out of the 356 cases investigated the total mortality was 20. Of this number one patient, who had exophthalmic goitre complicated by auricular fibrillation and severe myocardial damage, died without any operation being performed. All the remaining deaths occurred after operation. Of these, 17 occurred in exophthalmic goitre cases and 3 in toxic goitres. Three of the exophthalmic goitre deaths were those of patients with auricular fibrillation; of these, one occurred after partial thyroidectomy, a second after lobectomy, and a third after ligation of the right superior thyroid artery only.

Partial thyroidectomy with removal of three-quarters to seven-eighths of the gland was the usual procedure, unless there was a definite contraindication, when a primary ligation of one or more of the thyroid vessels was followed three or four months later by partial thyroidectomy. Only one death ensued after simple ligation—namely, the case with auricular fibrillation already mentioned.

The following table (Table II) shows a comparison of the absolute and percentage mortality after operation between cases of Graves's disease, with and without auricular fibrillation.

TABLE II.

Condition.	Total Cases.	Absolute Mortality.	Percentage Mortality.
Exophthalmic goitre without A.F. ...	293	13	4.4
Toxic goitre without A.F. ...	33	3	9.1
Exophthalmic goitre with A.F. ...	19	3	15.8
Toxic goitre with A.F. ...	7	0	0
Total cases of Graves's disease without A.F.	326	16	4.9
Total cases of Graves's disease with A.F.	26	3	11.5

Although the numbers are small the post-operative mortality is increased by the presence of auricular fibrillation in these cases. The percentage is more than doubled. Another fact brought out by the above table is that the presence of auricular fibrillation in exophthalmic goitre is of much more serious import than in toxic goitre. This is not surprising if one considers the view expressed in an earlier part of this paper—namely, that auricular fibrillation is a natural sequel of prolonged thyrotoxicosis, such as occurs in patients with toxic goitres, whereas its occurrence in exophthalmic goitre, in which the symptoms are usually of a few months' duration only, points to a severe grade of poisoning. On the other hand the mortality of exophthalmic cases without auricular fibrillation is less than half that of toxic goitres without auricular fibrillation.

The presence of auricular fibrillation in Graves's disease must be considered a distinctly unfavourable complication as regards the operative risk. It is associated, as a rule, with cardiac enlargement, a rapid pulse rate, and signs of congestive failure. The effect of the excessive thyroid secretion, as shown by the raised basal metabolic rate, is aggravated by an added impairment of cardiac function due to the congestive failure. It is essential, therefore, that the thyrotoxicosis should be reduced, and the ventricular rate controlled, before operative procedure is contemplated. At the Royal Free Hospital Lugol's solution in increasing doses up to 30 minims daily and digitalis tincture in doses of 10 to 20 minims three times daily are given, until the optimum state of the patient is reached, and the nature and extent of the operation is dependent on the degree of improvement attained. Digitalis is well borne by these patients, and they can take larger doses than patients suffering from other types of auricular fibrillation without intolerance. I have never found any untoward effect from digitalis medication.

Conclusions.

1. Auricular fibrillation occurs rather more frequently in toxic than in exophthalmic goitres.
2. Its presence in exophthalmic goitres is more serious than in toxic goitres, as shown by the increased post-operative mortality.
3. Auricular fibrillation is not of itself a contraindication to operative treatment, although it is an added risk.
4. The need for thorough pre-operative medical treatment is intensified by the presence of auricular fibrillation.
5. Primary ligation deserves careful consideration as a means of treating severe cases. In most cases, when one or more of the thyroid vessels have been tied, the improvement in the general and cardiac condition of the patient has allowed the major operation to be performed without undue risk.

My thanks are due to my colleagues Mr. Cecil A. Joll and Mr. L. E. C. Norbury for their kindness in giving me the opportunity of collaborating with them in the treatment of their cases, and to Miss Geraldine Barry, surgical registrar, for her help in collecting certain particulars for me from the case records.

REFERENCES.

1. Willius, T. A., Boothby, W. M., and Wilson, L. B.: *Trans. Assoc. Amer. Physicians*, xxxviii, 1923, p. 137.
2. Tinker, M. B.: *Journ. Amer. Med. Assoc.*, lxxix, October 14th, 1921, p. 1291.
3. Goodall, J. Strickland: *Med. Journal and Record*, January 2nd, 1924.
4. Hamilton, E. B.: *Surg. Clin. N. Amer.*, iv, 1924, p. 1411.
5. Read, J. M.: *Journ. Amer. Med. Assoc.*, lxxxix, 1927, p. 493.
6. Dameshek, W.: *Boston Med. and Surg. Journ.*, cxc, 1924, p. 487.
7. Phillips, J., and Anderson, J. P.: *Journ. Amer. Med. Assoc.*, lxxxix, October 14th, 1921, p. 1291.
8. Lahey, F. H., and Hamilton, E. B.: *Surg., Gynecol. and Obstet.*, xxxix, July, 1924, p. 10.
9. Smith, J., and Colvin, L. T.: *Amer. Clin. Med.*, v, 1927, p. 616.
10. Kerr, W. J., and Henzel, G. C.: *California State Journ. Med.*, xx, 1922, p. 306.
11. Krumbhaar, E. B.: *Amer. Journ. Med. Sci.*, clv, 1918, p. 175.
12. Dunhill, T. P., Fraser, F. R., and Stott, A. W.: *Quart. Journ. Med.*, xvii, 1923-1924, p. 326.
13. Dunhill, T. P.: *Trans. Life Assur. Med. Off. Assoc.*, London, December, 1928.

URETHRAL CALCULI—ANCIENT AND MODERN.

BY

A. L. URQUHART, O.B.E., M.B., D.P.H.,
PROFESSOR OF PATHOLOGY, UNIVERSITY OF EGYPT.

DURING the last year two urinary calculi have been presented to the Pathological Museum of the University of Egypt. These calculi show so remarkable a resemblance of form, the one to the other, that I have ventured to make a few notes upon them.

The smaller stone (Fig. 1) was removed in December, 1928, by Dr. Katib, assistant surgeon to the Kasr-el-Aini

FIG. 1.

FIG. 2.

Hospital, Cairo, from the urethra of a boy 8 years of age. The history which accompanied the specimen stated that the child complained of a lump in the scrotum and perineum. No complaint was made of pain or frequency of micturition. The flow of urine was not interfered with. A slight urethral discharge was present. The stone was cut down upon and removed, and the boy made a perfect recovery. The stone itself weighed 41.5 grams, and is