

## **Surgical management of amiodarone-associated thyrotoxicosis**

Ian R Gough and Jenny Gough

AMIODARONE is used in the management of cardiac dysrhythmias. Accumulation of amiodarone in the thyroid gland may result in thyroid dysfunction, either hypothyroidism or thyrotoxicosis.<sup>1</sup>

Amiodarone-associated thyrotoxicosis (AAT) occurs in about 3% of patients.<sup>2</sup> In some patients, cessation of amiodarone is not practical, as it may be the only effective anti-arrhythmic agent. Furthermore, cessation of amiodarone may be followed by a rebound rise in tri-iodothyronine, which worsens the thyrotoxic state.<sup>3,4</sup> Even when amiodarone can be discontinued, AAT can take up to nine months to resolve. Medical management may be ineffective and can result in complications, or sometimes death.<sup>5</sup>

In these very difficult situations, surgery has an important role. In the past it was thought that the risk of thyroid storm and the risks associated with anaesthesia would preclude surgery. However, recent experience has demonstrated that surgery may be performed safely and successfully, as illustrated in the case reports summarised in Box 1.

### **Discussion**

The patients all had severe cardiac disease and AAT refractory to medical treatment, yet general anaesthesia and total thyroidectomy were successful and uncomplicated in each case. All patients recovered rapidly and remain well and euthyroid on thyroxine replacement therapy. Patient 1 had a large multinodular goitre and the other four had normal-sized or slightly enlarged thyroid

glands at the time of surgery. The histological findings in all cases showed a similar destructive thyroiditis (Box 2).

Up to 1996 only 20 cases of AAT treated by surgery had been reported.<sup>3,4,6-10</sup> However, in the past few years, a further 29 cases have been documented.<sup>5,11,12</sup> Including the five cases described here, there have been 54 cases, of which 19 (35%) have been in Australia. Even allowing for possible publication bias, the results are exceptionally good, with no surgical mortality reported.

It is standard practice to render thyrotoxic patients euthyroid preoperatively. This is not possible in AAT, yet postoperative thyroid storm appears to be an extremely rare event. Most patients are suitable for general anaesthesia, and local anaesthesia would probably be more stressful. There is discussion among anaesthetists as to the choice of anaesthetic agents, with some advocating total intravenous anaesthesia<sup>11,13</sup> and others favouring inhalation anaesthesia.<sup>12</sup>

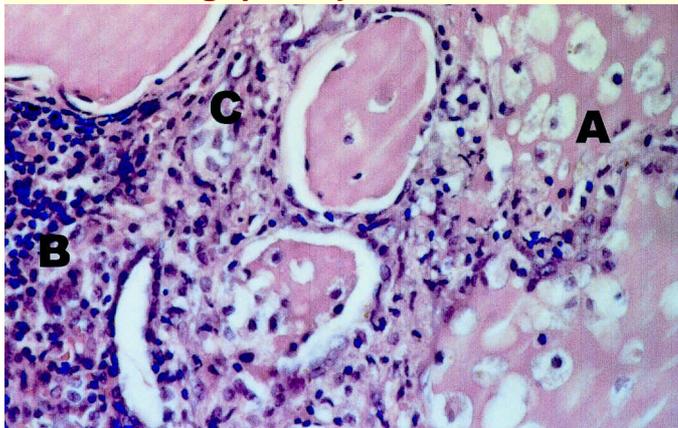
All authors agree that the medical management of patients with AAT is problematical and difficult.<sup>1,14</sup> Apart from the doubtful success of medical treatment,<sup>5</sup> it can be associated with prolonged illness and additional complica-

#### **Royal Brisbane Hospital, Herston, QLD.**

**Ian R Gough**, MD, FRACS, Clinical Professor of Surgery, University of Queensland; **Jenny Gough**, MB BS, Principal House Officer (Surgery).  
Reprints: Professor Ian R Gough, Wesley Medical Centre, 40 Chasely Street, Auchenflower, QLD 4066.  
gough@orangemail.com.au

### **1: Summary of case reports for five patients with amiodarone-associated thyrotoxicosis who were treated successfully with total thyroidectomy**

Patient	Age (years)	Sex	Clinical features	Treatment preceding total thyroidectomy
1	82	F	Toxic multinodular goitre treated with carbimazole for 20 years. Commenced amiodarone for atrial fibrillation and developed thyrotoxicosis after four months.	Amiodarone discontinued, but patient remained thyrotoxic on propylthiouracil, prednisone and potassium perchlorate.
2	39	M	Four operations for tetralogy of Fallot and on waiting list for cardiac transplantation. Recurrent ventricular tachycardia treated with amiodarone for three years. Automatic implanted cardiac defibrillator required for worsening ventricular tachycardia due to thyrotoxicosis.	Amiodarone ceased, but patient remained thyrotoxic on carbimazole, prednisone, potassium perchlorate and lithium carbonate.
3	32	M	Familial dilated cardiomyopathy with recurrent ventricular tachycardia treated with amiodarone for four years. Thyrotoxicosis for 18 months before referral; ejection fraction 24%.	Amiodarone continued, and patient remained thyrotoxic on propylthiouracil, potassium perchlorate and lithium carbonate.
4	61	M	Rheumatic heart disease with aortic valve replacement and congestive cardiac failure. Ventricular tachycardia and fibrillation treated with amiodarone for two years and also sinoatrial node ablation, pacemaker and warfarin. Thyrotoxicosis developed two months after amiodarone was discontinued.	Thyrotoxicosis persisted on propylthiouracil, prednisone and lithium carbonate.
5	63	M	Coronary artery bypass grafts and cardiac pacemaker. Atrial fibrillation treated for two years with amiodarone and warfarin. Thyrotoxicosis developed three months after amiodarone was discontinued.	Thyrotoxicosis persisted on carbimazole and prednisolone.

**2: Photomicrograph of thyroid in Patient 5**

**A:** Destruction of follicles, with loss of follicular epithelial cells and macrophages in the colloid.

**B:** Marked inflammatory cell infiltration.

**C:** Fibroblasts creating fibrous tissue.

Haematoxylin and eosin stain; original magnification x350.

Courtesy of Queensland Medical Laboratory.

tions such as occurred in two of our patients, who had serious infections related to prednisone-induced immunosuppression that delayed the curative surgery. Thyroidectomy is the only treatment that reliably allows the continued use of amiodarone.<sup>15</sup>

Clinical decisions about apparent “unfitness for surgery” have sometimes been made without consulting an appropriate anaesthetist or endocrine surgeon. Despite the obvious difficulties with management of patients with AAT, anaesthesia and surgery may be performed safely and successfully. Consideration should be given to referring the patient for early surgery, particularly in cases where it would be advantageous to continue the amiodarone therapy and before complications of immunosuppression due to prednisone therapy have occurred. Lessons for practice are listed in Box 3.

**Competing interests**

None declared.

**References**

- Newman CM, Price A, Davies DW, et al. Amiodarone and the thyroid: a practical guide to the management of thyroid dysfunction induced by amiodarone treatment. *Heart* 1998; 79: 121-127.
- Smyrk TC, Goellner JR, Brennan MD, Carney JA. Pathology of the thyroid in amiodarone-induced thyrotoxicosis. *Am J Surg Pathol* 1987; 11: 197-204.
- Brennan MD, van Heerden JA, Carney JA. Amiodarone-associated thyrotoxicosis (AAT). Experience with surgical management. *Surgery* 1987; 102: 1062-1067.
- Farwell AP, Abend SL, Huang SK, et al. Thyroidectomy for amiodarone-induced thyrotoxicosis. *JAMA* 1990; 263: 1526-1528.
- Claxton S, Sinha SN, Donovan S, et al. Refractory amiodarone-associated thyrotoxicosis: an indication for thyroidectomy. *Aust N Z J Surg* 2000; 70: 174-178.
- Samanta A, Jones GR, Burden AC, Barrie WW. Thoracic inlet compression due to amiodarone induced goitre. *Postgrad Med J* 1985; 61: 249-250.

**3: Lessons for practice**

- Amiodarone (an iodine-containing drug used for the treatment of cardiac arrhythmias) may cause a destructive thyroiditis, resulting in long-lasting thyrotoxicosis refractory to medical management.
- Total thyroidectomy under general anaesthesia may be performed safely and successfully in patients with amiodarone-associated thyrotoxicosis.

- Mehra A, Widerhorn J, Lopresti J, Rahimtoola SH. Amiodarone-induced hyperthyroidism: thyroidectomy under local anaesthesia. *Am Heart J* 1991; 122: 1160-1161.
- Mulligan DC, McHenry CR, Kinney W, Esselstyn CB Jr. Amiodarone-induced thyrotoxicosis: clinical presentation and expanded indications for thyroidectomy. *Surgery* 1993; 114: 1114-1119.
- Painvin I, Dupuis JM, Victor J, et al. [Value of thyroidectomy in amiodarone-induced hyperthyroidism. Apropos of 3 cases.] *Arch Mal Coeur Vaiss* 1996; 89: 445-449.
- Le Cosquer P, Guerin-Robardey AM, Ossart M. Amiodarone-induced thyrotoxicosis cured by thyroidectomy. *Ann Fr Anesth Reanim* 1996; 15: 1092-1094.
- Hamoir E, Meurisse M, Defechereux T, et al. Surgical management of amiodarone-associated thyrotoxicosis: too risky or too effective? *World J Surg* 1998; 22: 537-543.
- Sutherland J, Robinson B, Delbridge L. Anaesthesia for amiodarone-induced thyrotoxicosis: a case review. *Anaesth Intensive Care* 2001; 29: 24-29.
- Gough IR, Meyer-Witting M. Surgery and anaesthesia for amiodarone-associated thyrotoxicosis. *Aust N Z J Surg* 2000; 70: 155-156.
- Bartalena L, Brogioni S, Grasso L, et al. Treatment of amiodarone-induced thyrotoxicosis, a difficult challenge: results of a prospective study. *J Clin Endocrinol Metab* 1996; 81: 2930-2933.
- Harjai KJ, Licata AA. Effects of amiodarone on thyroid function. *Ann Intern Med* 1997; 126: 63-71. □

**An evidence-based approach**

**COMPLEMENTARY/ALTERNATIVE MEDICINE**

There is an ever-increasing demand for this type of therapy and the need for practitioners to understand how these therapies and therapists fit into the care of patients. The information in this book is based on solid scientific evidence, enabling you to take the guesswork out of understanding, referring patients for, recommending or performing alternative treatments. This is not a text book rather, it explains how these therapies fit into the current evidence base. Clinicians will find it very useful, as the practical text will equip you with the necessary tools to judge the effectiveness of alternative/complementary treatments you or your patients may be using.

Only \$106.70

Includes GST  
AMA members receive a 10% discount!

To ORDER, or for further information, contact the Book Sales Coordinator:  
**AMPCo, Australasian Medical Publishing Co Pty Ltd** 206 20 00 05 04  
 Private Bag 901 North Sydney NSW 2059. Ph 02 9954 8666 • Fax 02 9956 7644

Tax: Dr/Mr/Ms: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Postcode: \_\_\_\_\_

Pls. (Bus) \_\_\_\_\_ Fax: \_\_\_\_\_

Cheque/MO enclosed OR  Charge my Credit Card AMEX ONLY Security No. \_\_\_\_\_  
 Bankcard  MasterCard  Diners  Amex  Visa

Account No. \_\_\_\_\_  
 Expiry Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Name: \_\_\_\_\_  
 Signature: \_\_\_\_\_