REVIEW

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Practical Management Guide for Clinicians Who Treat Patients with Amiodarone

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ABSTRACT

Amiodarone, an iodinated benzofuran derivative with Class I, II, III, and IV antiarrhythmic properties, is the most commonly used antiarrhythmic drug used to treat supraventricular and ventricular arrhythmias. Appropriate use of this drug, with its severe and potentially life-threatening adverse effects, requires an essential understanding of its risk-benefit properties in order to ensure safety. The objective of this review is to afford clinicians who treat patients receiving amiodarone an appropriate management strategy for its safe use. The authors of this consensus management guide have thoroughly reviewed and evaluated the existing literature on amiodarone and apply this information, along with the collective experience of the authors, in its development. Provided are management guides on the intravenous and oral dosing of amiodarone, appropriate outpatient follow-up of patients taking the drug, its recognized adverse effects, and recommendations on when to consult specialists to help in patient management. All clinicians must be cognizant of the appropriate use, follow-up, and adverse reactions of amiodarone. The responsibility incurred by those treating such patients cannot be overemphasized.

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KEYWORDS: Adverse drug reactions; Amiodarone; Atrial fibrillation; Ventricular fibrillation; Ventricular tachycardia

Amiodarone is the most commonly used antiarrhythmic drug to treat supraventricular and ventricular arrhythmias.[1-3] Because of severe and potentially life-threatening adverse drug reactions, careful use is essential to derive optimal benefits from the drug with the least risk. This guide updates a version published in 2007,[4] reviews indications for use, and recommends strategies to ensure safe drug use. Recommendations are based on a thorough and careful evaluation of the literature and the collective experience of the writing committee.

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INDICATIONS FOR USE

Oral Amiodarone

Ventricular Arrhythmias. Oral amiodarone was approved by the Food and Drug Administration (FDA) for the treatment of life-threatening, recurrent ventricular arrhythmias, such as ventricular fibrillation or ventricular tachycardia associated with hemodynamic instability. Oral dosing may require a high-dose load to achieve efficacy.

Prospective trials have shown long-term neutral, if not encouraging, impact of amiodarone on survival in patients after myocardial infarction with left ventricular systolic dysfunction and with dilated cardiomyopathy.[5-9] A meta-analysis showed a 10%-19% reduction in mortality in high-risk patients given amiodarone.[10] A subsequent meta-analysis reported amiodarone to have neutral effect on survival but was associated with a two- to fivefold increased risk of pulmonary and thyroid toxicity.[11] One prospective analysis indicated that amiodarone may adversely affect

survival in patients with New York Heart Association functional class III heart failure.[12]

Implantable cardioverter-defibrillators are superior to amiodarone to improve survival in patients with sustained ventricular tachycardia or ventricular fibrillation due to a nonreversible cause and in patients at high risk for sudden cardiac death (selected postmyocardial infarction and cardiomyopathy patients).[12,13] Amiodarone is the antiarrhythmic drug of choice for patients with ventricular tachycardia or ventricular fibrillation who are not otherwise candidates for an implantable cardioverter-defibrillator. This is based on the drug's efficacy,[10,14,15] its minimal negative inotropic effects,[16] and its low proarrhythmic potential.[17] Concomitant antiarrhythmic therapy, most commonly amiodarone, is used to treat atrial and ventricular arrhythmias in 30%-70% of patients with an implantable cardioverter-defibrillator. It has been shown that amiodarone, combined with a beta-blocker, reduced frequent implantable cardioverter-defibrillator shocks.[18] Amiodarone can also suppress symptomatic, nonsustained ventricular tachycardia.

CLINICAL SIGNIFICANCE

- Amiodarone is the most commonly used antiarrhythmic drug to treat supraventricular and ventricular arrhythmias.
- Because of severe and potentially life-threatening adverse drug reactions, careful use is essential to derive optimal benefits from the drug with the least risk.
- This guide updates a version published in 2007, reviews indications for use, and recommends strategies to ensure safe drug use.
- Recommendations are based on a thorough and careful evaluation of the literature and the collective experience of the writing committee.

Atrial Fibrillation. Although amiodarone is not FDA-approved to treat atrial fibrillation, it is commonly used for this purpose. Due to the drug's long half-life and large volume of distribution, oral dosing to achieve efficacy may take days to weeks. The 1-year efficacy to maintain sinus rhythm exceeds other antiarrhythmic drugs. In one prospective trial, 65% of patients taking amiodarone vs 37% taking sotalol or propafenone remained in sinus rhythm.[19] Amiodarone should be considered only after failure of, or contraindications to, other drugs due to its potential for end-organ toxicity. Per American College of Cardiology/American Heart Association/Heart Rhythm Society guidelines,[20] amiodarone can be used to help maintain sinus rhythm for patients after myocardial infarction, with heart failure, left ventricular systolic dysfunction, left ventricular hypertrophy, or with drug-refractory symptomatic atrial fibrillation. Amiodarone may prevent atrial fibrillation following cardiac surgery,[21,22] but preoperative prophylactic amiodarone has not been universally accepted due to logistical problems of preoperative loading, minimal effect on length of stay, concerns for potential toxicity, and cost. Although amiodarone can slow the ventricular response in atrial fibrillation, it should be used only after digoxin, beta-blockers, and calcium channel antagonists are ineffective, contraindicated, or not tolerated.

Intravenous Amiodarone

Intravenous amiodarone can treat atrial and ventricular arrhythmias. Even though tissue levels increase rapidly, effective arrhythmia suppression and prevention can take days or longer. Sinus bradycardia, atrioventricular block, and rarely, torsades de pointes ventricular tachycardia occur following intravenous loading.

Ventricular Arrhythmias. Intravenous amiodarone is FDA-approved for treatment and prophylaxis of recurrent ventricular fibrillation and hemodynamically unstable ventricular tachycardia, and to suppress and prevent ventricular fibrillation or ventricular tachycardia in patients who are candidates for oral amiodarone but unable to take the oral preparation. Based on the 2010 Advanced Cardiac Life Support guidelines, intravenous amiodarone is indicated as the antiarrhythmic drug of first choice for persistent ventricular fibrillation or pulseless ventricular tachycardia resistant to other resuscitative measures including epinephrine.[23] However, in 2 prospective double-blind studies that evaluated intravenous amiodarone for shock-resistant out-of-hospital cardiac arrest,[24,25] amiodarone was associated with a greater chance of survival to hospital admission but there was no survival benefit to hospital discharge.

Amiodarone can treat lidocaine-refractory ventricular tachycardia or ventricular fibrillation after acute myocardial infarction, "electrical storm" (ie, multiple episodes of recurrent rapid ventricular tachycardia or ventricular fibrillation requiring multiple defibrillations over a short time period), and nonsustained and recurrent ventricular tachycardia in patients with implantable cardioverter-defibrillators who experience frequent device shocks.[26]

Atrial Fibrillation and Other Supraventricular Arrhythmias. Intravenous amiodarone can treat supraventricular tachyarrhythmias, most commonly atrial fibrillation, in acute settings, including perioperative cardiovascular surgery, in intensive care units, and in emergency departments.[27-29] While it can slow the ventricular response during acute-onset atrial fibrillation,[28] it is not FDA-approved for this use. In placebo-controlled trials, intravenous amiodarone has not been shown to convert atrial fibrillation acutely.[29,30] In a prospective active-control trial against vernakalant, intravenous amiodarone converted only 5.2% of patients with persistent atrial fibrillation to sinus rhythm within 90 minutes.[31] Although it can reduce atrial fibrillation occurrence after cardiac surgery,[32,33] a beneficial

Table 1 Adverse Reactions to Amiodarone

Reaction	Incidence, %	Diagnosis	Management
Pulmonary	2	Cough or dyspnea (or both), especially with focal or diffuse opacities on high-resolution CT scan and decrease in D_LCO from baseline	Usually discontinue drug; corticosteroids may be considered; occasionally, continue drug if levels high and abnormalities resolve; rarely, continue drug with corticosteroid if no other option
Gastrointestinal tract	30	Nausea, anorexia and constipation	Symptoms may decrease with decrease in dose
	15-30	AST or ALT level $>2\times$ normal	If hepatitis considered, exclude other causes
	<3	Hepatitis and cirrhosis	Consider discontinuation, biopsy, or both to determine whether cirrhosis is present
Thyroid	4-22	Hypothyroidism	L-thyroxine
	2-12	Hyperthyroidism	Corticosteroids, propylthiouracil or methimazole; may need to discontinue drug; may need thyroidectomy
Skin	<10	Blue discoloration	Reassurance; decrease in dose
	25-75	Photosensitivity	Avoidance of prolonged sun exposure; sunblock; decrease in dose
Central nervous system	3-30	Ataxia, paresthesias, peripheral polyneuropathy, sleep disturbance, impaired memory and tremor	Often dose dependent, and may improve or resolve with dose adjustment
Ocular	<5	Halo vision, especially at night	Common and does not require drug discontinuation
	≤ 1	Optic neuropathy	Discontinue drug and consult an ophthalmologist
	>90	Photophobia, visual blurring, and microdeposits	Corneal deposits common, indicate that drug is being taken, and do not require discontinuation.
Heart	5	Bradycardia and AV block	May need permanent cardiac pacing
	<1	Ventricular proarrhythmia	Usually discontinue drug
Genitourinary	<1	Epididymitis and erectile dysfunction	Pain may resolve spontaneously

ALT = alanine aminotransferase; AST = aspartate aminotransferase; AV = atrioventricular; CT = computed tomography; D_LCO = diffusion capacity for carbon monoxide.

clinical impact (length of hospital stay or reduction in adverse outcomes) has not been demonstrated.

FOLLOW-UP OF THE PATIENT TAKING AMIODARONE

Office evaluation, to assess amiodarone-related symptoms (Table 1), arrhythmia recurrences, drug titration, laboratory testing, and changes in drug therapy, should occur every 3-6 months for the first year and every 6 months thereafter.

History

Fatigue (suggesting bradycardia, atrioventricular block, or hypothyroidism), dyspnea or cough (suggesting pulmonary toxicity), palpitations (suggesting hyperthyroidism or recurrence of arrhythmias), syncope, visual changes, skin changes (including photosensitivity), weight loss (suggesting hyperthyroidism), paresthesias or weakness (suggesting peripheral neuropathy), changes in drug therapy, and sleep disturbances should be noted. If visual changes are reported, an ophthalmologist should be consulted; for acute loss of vision, emergency evaluation is required. Drug interactions, especially with digoxin and warfarin, can occur, requiring dose adjustments of these drugs (Table 2). In patients with implantable cardioverter-defibrillators, amiodarone may slow the ventricular tachycardia rate so it falls below the rate detection. It may increase the energy required to defibrillate. Thus, the drug should not be started or dose changed without involvement of an electrophysiologist or cardiologist.

Physical Examination

Vital signs, regularity of pulse, skin color, thyroid, rales, signs of left ventricular dysfunction, hepatomegaly, and

Table 2 Major Amiodarone Drug Interactions

Drug	Interaction
Digoxin	Increased concentration and effect with sinus and AV node depression and gastrointestinal tract and neurologic toxicity
Warfarin	Increased concentration and effect
Quinidine, procainamide, disopyramide	Increased concentration and effect; torsades de pointes ventricular tachycardia; bradycardia and AV block
Diltiazem, verapamil	Bradycardia and AV block
β-blockers	Increased concentration and effect
Flecainide	Increased concentration and effect
Phenytoin	Hypotension and bradycardia
Anesthetic drugs	Increased concentration and effect
Cyclosporine	Promote liver function abnormalities
Statins	Myalgias, myopathy, rhabdomyolysis

AV = atrioventricular.

neurologic abnormalities (tremor, difficulty with writing, or gait disturbance) should be noted.

Routine Testing

Minimum baseline studies are listed in Table 3. Follow-up evaluation should include, at a minimum, a yearly electrocardiogram and chest x-ray study, and semiannually, a thyroid-stimulating hormone (TSH) test and liver enzymes. Surveillance amiodarone levels are generally of little use, but can help if arrhythmias occur or recur, or if new symptoms develop, especially after dose titration or a change in drug formulation (to or from generic preparations); amiodarone levels may help determine if the drug can be titrated downward or when another antiarrhythmic drug can be substituted.

SERIOUS AMIODARONE TOXICITIES

Meticulous follow-up is central to the care of patients taking amiodarone. Adverse effects are common, with prevalence as high as 15% in the first year of use and 50% during long-term use (Table 1).[34-36] Especially when used for non-life-threatening arrhythmias, such as atrial fibrillation, the risk-benefit ratio may weigh in favor of risk rather than benefit if adverse effects occur. In a recent study in patients <65 years of age with atrial fibrillation, amiodarone was discontinued in the first year by 52%.[37]

Neurologic and visual changes, such as "halos" around lights, are usually dose-related, and often occur in the first phases of loading. Pulmonary, thyroid, and gastrointestinal toxicities are discussed in detail below. Due to a long elimination half-life of 55 (and up to 142) days, it may take months before an adverse effect is reversed.[38,39] Thus, the lowest effective dose should be used; early assessment and intervention is necessary to prevent serious organ toxicity. Continued assessment of drug efficacy, titration of drug dose after achieving a steady state, evaluation and management of adverse effects, and attention to drug-drug and drug-device interactions are crucial. Recommendations regarding referral to a subspecialist are outlined on Table 4.

Table 3 Recommended Laboratory Testing in Patients Receiving Amiodarone

Type of Test	Time When Test is Performed*
Liver function tests	Baseline and every 6 mo
Thyroid function tests	TSH, free T4, and total or free T3 at baseline with a follow-up TSH every 6 mo
Chest x-ray study	Baseline and then yearly
Ophthalmologic evaluation	At baseline if visual impairment or for symptoms
Pulmonary function tests (with D_LCO)	Baseline and for unexplained cough or dyspnea, especially in patients with underlying lung disease, if there are suggestive x-ray film abnormalities, and if there is a clinical suspicion of pulmonary toxicity
High-resolution CT scan	If clinical suspicion of pulmonary toxicity
Electrocardiogram	Baseline and when clinically relevant

D_LCO = diffusion capacity of carbon monoxide; Free T4 = free thyroxine; TSH = thyroid stimulating hormone.

*If clinical circumstances warrant, more frequent follow-up will be necessary.

Pulmonary Toxicity

Amiodarone-induced pulmonary toxicity is well described.[40-44] The clinical presentation is most commonly diffuse interstitial lung disease or a hypersensitivity syndrome that may mimic infection. Patients may also manifest acute respiratory distress syndrome, pulmonary nodules or solitary masses, or (rarely) pleural effusions. Pathologic findings include interstitial pneumonitis, organizing pneumonia, diffuse alveolar hemorrhage, or diffuse alveolar damage.[43-46] Early reports found the incidence of pulmonary toxicity to be as high as 15%,[35,42,45] while more recent trials (utilizing significantly lower maintenance doses) note incidence rates of 5% or less.[40,42-44]

Table 4 When to Refer to an Electrophysiologist or another Subspecialist for Suspected Amiodarone Organ Toxicity

When to consult an electrophysiologist
1. Worsening arrhythmia symptoms
2. Evidence of amiodarone toxicity requiring changes in drug dosing or drug discontinuation. Until the arrhythmia problem stabilizes, the patient may require intensified monitoring, electrophysiological testing, ablative therapy, or pacemaker or ICD implantation
3. When amiodarone is started in patients with an ICD (for electrophysiological study and defibrillation threshold testing to assess amiodarone-induced slowing of VT rate and efficacy of defibrillation, respectively)
4. Pregnant patients who require amiodarone
5. Pediatric patients who require amiodarone

When to consult an endocrinologist
1. Whenever hyperthyroidism is suspected
2. An acutely ill patient where interpretation of TFTs is difficult
3. When considering treating subclinical hypothyroidism

When to consult a pulmonologist*
1. Abnormal chest radiography at baseline or during follow-up
2. Abnormal pulmonary function test value (particularly forced vital capacity and D_LCO) at baseline or follow-up evaluation
3. New cough or dyspnea, especially if otherwise unexplained or unexpected

When to consult a gastroenterologist or hepatologist
1. Hepatocellular enzyme increase to >2× normal

D_LCO = diffusing capacity for carbon monoxide; ICD = implantable cardioverter-defibrillator; TFT = thyroid function test; VT = ventricular tachycardia.

*Patients referred for pulmonary consultation for suspected amiodarone toxicity should undergo pulmonary function testing (spirometry, lung volume determination, and D_LCO measurement) and high-resolution computed tomography scanning of the chest.

A meta-analysis of 6500 patients concluded that the risk of pulmonary toxicity is ~2%, more common in older patients, with higher doses, and with longer duration of therapy.[17] Although some studies suggest that preexisting lung disease is associated with a higher risk of pulmonary toxicity, the cumulative data on this issue are discordant.[41,47] It may be that underlying lung disease lowers the threshold for symptom detection in such patients. Serial pulmonary function testing is a nonspecific, though sensitive, marker of pulmonary toxicity (likely due to a high incidence of heart failure in the population receiving the drug) and is of unclear clinical benefit.[48] Testing may have utility in select patients who develop respiratory symptoms because the absence of a decrease in diffusing capacity for carbon monoxide (D_LCO) of 20% from baseline has a high negative predictive value.[49]

Pulmonary toxicity generally presents in the first year of therapy with acute or subacute cough; later manifestations include progressive dyspnea and, occasionally, fever. Pulmonary function testing typically shows a restrictive pattern and decreased D_LCO. Chest computed tomography (CT) generally shows diffuse ground glass and reticular abnormalities, evidence of ongoing inflammation and fibrosis. Any increase in lung (as well as liver or spleen) attenuation on CT scan reflects the parenchymal accumulation of amiodarone but is not predictive of current or future pulmonary toxicity.[48]

Routine lung biopsy in suspected cases is not recommended because the pathologic findings of amiodarone pulmonary toxicity (eg, interstitial pneumonia, focal foamy alveolar macrophages) are nonspecific,[43,45,46] Bronchoscopy with bronchoalveolar lavage, with or without transbronchial lung biopsy, may be useful in select cases of suspected pulmonary toxicity,[50] particularly in those patients with fever or localized opacities, in order to exclude infectious diseases. Surgical lung biopsy should generally be avoided given reports of postoperative acute respiratory distress syndrome.[49,51]

There is no single pathognomonic finding to diagnose amiodarone-induced pulmonary toxicity. A high index of suspicion in a symptomatic patient, coupled with consistent physiologic and radiographic findings and a rigorous evaluation to exclude alternative etiologies (in particular, infection and heart failure) should suggest the diagnosis. Treatment consists of discontinuing amiodarone and, in severe cases, administration of corticosteroids. There are no good data to guide dosing and duration of corticosteroid therapy. Typically, 40-60 mg of prednisone (or equivalent) daily is prescribed; the response can be rapid. Because elimination of amiodarone is slow, prolonged therapy may be required. The steroid dose can generally be decreased after 4-8 weeks to minimize side effects. While mortality from amiodarone-induced pulmonary toxicity has been reported to approach 10%,[42] these data likely represent selection for the most severely ill patients; it is therefore likely that the true mortality rate is substantially lower, especially if the diagnosis is made early.

Effects on Thyroid Function

Amiodarone use can lead to hypo- or hyperthyroidism.[52] Acutely, there is an increase in TSH, an increase in free T4, and a decrease in free T3.[53] After 3 months, a new equilibrium is reached, and TSH normalizes, again becoming the most reliable marker of thyroid status.[52,53]

Hypothyroidism. In iodine-sufficient areas, such as the US, the prevalence of amiodarone-induced hypothyroidism is as high as 22%.[52] Typically, amiodarone-induced hypothyroidism occurs within the first 1-24 months of treatment.[54] Symptoms of hypothyroidism may be nonspecific and subtle. Treatment is L-thyroxine, with a goal of normalizing the TSH. Most patients who do not have underlying Hashimoto's thyroiditis will have resolution of hypothyroidism after discontinuation of amiodarone.

Hyperthyroidism. Amiodarone-induced thyrotoxicosis is less prevalent,[52,53] but difficult to treat and associated with increased mortality, particularly in older patients with reduced ventricular function. An endocrinologist should be consulted for evaluation at the first hint of disease.

Amiodarone-induced thyrotoxicosis can occur suddenly at any time during or even months after treatment. Given the beta-blocking effects of amiodarone, classic findings of thyrotoxicosis are often absent. Common findings include weight loss or a significant change in warfarin dosing. In addition, any change in cardiac status such as new or recurrent atrial fibrillation or more frequent implantable cardioverter-defibrillator discharges should precipitate a thyroid evaluation.

Treatment of amiodarone-induced thyrotoxicosis should be guided by the underlying etiology. While attempts to divide amiodarone-induced thyrotoxicosis into 2 distinct subtypes[52,53] have provided insight into the pathophysiology of the disease, the practical utility of this division has been limited because in practice a large percentage of patients do not clearly fall into either of these subtypes.[55]

Some patients have preexisting thyroid disease (eg, Grave's disease) aggravated by the iodine load of amiodarone. If so, amiodarone should be discontinued and the patient treated with propylthiouracil or methimazole. As amiodarone effects will last for months, discontinuation will not result in immediate improvement.

In other patients, toxicity to the thyroid results in thyroiditis.[53,56] Unequivocal cases of thyroiditis can be treated with prednisone and continuation of amiodarone. The thyroiditis is typically self-limited and often followed by hypothyroidism.[57]

For the remainder of the patients, perhaps the majority, in whom the etiology is not clear, one strategy is to start an antithyroid drug and prednisone initially. If there is improvement in 1-2 weeks, the disease is prednisone-responsive and discontinuation of the antithyroid drug can be considered.

If drug therapy does not improve thyroid status, options are limited. Due to the large iodine load, radioactive I^{131} ablation is generally not feasible. Potassium perchlorate, used in

amiodarone-induced thyrotoxicosis, is no longer available in the US. Thyroidectomy remains the most effective option for high-risk patients (eg, those being treated for ventricular tachycardia). Surgery by an experienced thyroid surgeon results in rapid resolution of the hyperthyroidism. For patients who need amiodarone again after prior discontinuation for amiodarone-induced thyrotoxicosis, prophylactic radioactive I^{131} ablative therapy is recommended and has proven successful in preventing recurrence if thyroidectomy has not been performed.

Preexisting hyperthyroidism is a risk factor for atrial fibrillation. The use of intravenous amiodarone as initial treatment for atrial fibrillation in a patient who is already hyperthyroid can result in acute exacerbation of hyperthyroidism due to the large iodine load. Thus, evaluation for hyperthyroidism is very important when intravenous amiodarone is used for new-onset atrial fibrillation.

Gastrointestinal/Liver Toxicity

Nausea, anorexia, and constipation are among the most common gastrointestinal effects of amiodarone, are dose-related, and rarely require specific treatment or intervention. Frank liver toxicity is rare; it occurs in up to 1% of patients treated annually.[58] Because amiodarone is heavily deposited in the liver and because of its long half-life, cumulative dose is important. Once toxicity is manifest, liver abnormalities may persist long after the drug is stopped. Amiodarone liver toxicity resembles alcoholic liver disease histologically and is accompanied by elevations of the hepatocellular enzymes alanine aminotransferase (ALT) and aspartate aminotransferase (AST). Some liver enzyme elevation is common, but unlike alcoholic liver disease, ALT and AST levels are elevated to a similar degree. Alkaline phosphatase levels may be normal or minimally elevated.

Liver toxicity may be asymptomatic, but when severe is accompanied by fatigue, nausea, and weight loss. Jaundice may occur. When end-stage disease develops, there is a fall in serum albumin levels, ascites, and encephalopathy. Liver biopsy shows variable findings, including micro- and macrovesicular fat, cell degeneration, inflammation, and when severe, fibrosis and Mallory bodies, as in alcoholic liver disease. Liver injury from amiodarone generally resolves after stopping the drug, but in rare cases may progress.

Due to amiodarone deposition in the liver, the organ is bright on CT scans resulting from iodination; this itself is not indicative of liver injury. Occasionally, intravenous amiodarone may precipitate acute liver injury within a day of infusion (ALT and AST increase up to 100 times the upper normal limit). This injury reverses after the infusion is stopped. Its mechanism is unknown and oral amiodarone can be tolerated thereafter. A recent report showed an increased risk for pancreatitis for patients receiving amiodarone,[59] but this is controversial.[60]

In view of these risks, liver function should be evaluated in follow-up. While ALT and AST elevation up to twice normal are not unusual and tolerated, greater increases require an evaluation of why the increase(s) occurred. Amiodarone may need to be discontinued if a reversible cause cannot be identified.

Neurological Toxicity

In one report, neurological complications were surprisingly common, occurring in up to 27.5% of the patients.[61] However, in another report, even including cognitive impairment, the risk of neurologic toxicity amounted to only approximately 2.8% and it was dependent on therapy duration.[62] At high doses, quadriplegia has been seen. More commonly, weakness and tremor occur. Peripheral neuropathy is possible. This is due more to demyelination than axonal loss.[63] Myopathy, polyneuropathy, and ataxia may not necessarily be reversible with amiodarone discontinuation.[64] There is no specific treatment for neurological toxicity except to discontinue or decrease the amiodarone dose and wait for its elimination or decreased effects.

CONCLUSION

Amiodarone can be a useful and potent drug to treat atrial and ventricular arrhythmias. Nevertheless, concerns about toxicity must be considered in long-term follow-up. Here, we provide guidance for amiodarone use and follow-up. Although judgment takes precedence over guidelines in clinical practice, this consensus provides a practical basis to help manage patients taking amiodarone. Providers caring for patients taking amiodarone must be cognizant of benefits and risks of the drug, and take responsibility for potential adverse outcomes or find a colleague who is qualified to do so. Accepting this responsibility should lead to improved patient outcomes.

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