PROTOCOL FOR THE INTRODUCTION OF MINOXIDIL THERAPY AS PART OF THE MANAGEMENT OF RESISTANT HYPERTENSION

Background

Minoxidil is a powerful arterial vasodilator that probably works by opening potassium channels. It has generally been used for the treatment of resistant hypertension owing to a belief that it is perhaps the most powerful vasodilator we have. To my knowledge it has not been the subject of any outcome trials in terms of clinical events and its use is reserved for those patients whose blood pressure appears uncontrollable by other means.

There are three major side effects of this drug probably all consequent upon arterial vasodilatation:

- Fluid retention. This is a phenomenon of all arterial vasodilators and generally its severity is proportional to the power of the vasodilator.
- A reflex tachycardia. This can be profound and unlike that seen with dihydropyridine calcium channel blocking agents does not disappear with time.
- Hypertrichosis. This is marked and usually precludes the use of the drug in females.

Because of the first two of these side effects, Minoxidil is invariably used in association with a loop diuretic (Frusemide or Bumetanide) and a rate limiting agent such as a beta-blocker or verapamil/diltiazem.

Rationale for a Protocol

Although this treatment regimen has been used successfully for many years, in the last six months two patients have been admitted as acute medical emergencies, with pulmonary oedema consequent upon the fluid retaining effects of Minoxidil. Standard practice has always been to advise general practitioners to slowly titrate the dose upwards from 2.5mg to a maximum of 15mg (the BNF indicates a higher maximal dose than this – 60 mg) with close monitoring of heart rate and tendency for fluid retention. Expectation has been that the general practitioner will increase the

dose of rate limiting agent and loop diuretic as necessary to ensure that side effects do not occur. Clearly this is not foolproof.

Aim of the Protocol

The aim of the enclosed protocol therefore is to ensure as best we can the safety of the introduction of Minoxidil in patients who are at risk.

Protocol for the Introduction of Minoxidil

1 If patient is female please ensure that the referring doctor has explained issues surrounding Minoxidil to the patient.

2 Ensure the patient is given enclosed sheet as an aide memoir to side effects.

3 A programme of weekly visits to the metabolic unit should be arranged, ensuring time of day remains constant.

4 At each visit the following are to be recorded:

- Current medication with doses
- Weight (ensure no shoes, no jacket and an empty bladder)
- Blood pressure and heart rate. These should be recorded as the mean of five readings in a supine position after at least five minutes rest.

5 Enquire from the patient as to whether they have noticed (since the last visit) either increased breathlessness or ankle swelling.

6 It is anticipated that all patients will start simultaneously on 2.5mg of Minoxidil, 50mg of Atenolol (or rate limiting calcium channel blocker if this is contraindicated) and 40mg of Frusemide. Other drugs would be at the discretion of the referring physician.

7 Minoxidil dose would be increased by 2.5mg weekly to a maximum of 15mg as long as blood pressure remains above 150 mm Hg systolic or 100 mm Hg diastolic.

8 The dose of Atenolol would be increased in multiples of 25mg if heart rate above 85 /min.

9 Frusemide dose to be increased in increments of 40mg per day if weight increased by >2 kgs or patient complains of breathlessness or ankle swelling.

10 Duty metabolic registrar to be called if there are any uncertainties over the clinical aspects of patient care.

11 All patients must be seen by a doctor (metabolic registrar) on the third visit and on the sixth (this would be the time of maximal dosage).

12 As soon as maximal dose is reached, target blood pressure reached or complication occurs, referring physician should be contacted.

13 At the end of six weeks an appointment should be made at the cardiovascular risk clinic for the referring physician.

Patient Information Leaflet

Your doctor at the cardiovascular risk clinic has indicated that you require Minoxidil therapy to attempt to lower your blood pressure. This is a powerful drug which has two significant side effects that require to be monitored. The first is that it can cause an increase in your heart rate, the second is that it can increase the tendency to retain fluid which can counter-balance the beneficial effect of the drug. For that reason Minoxidil is always given along with a drug to slow your heart rate and a diuretic (water tablet) to ensure that fluid is not retained.

As the dose of Minoxidil is increased it is often necessary to increase the dose of the diuretic and the drug used to slow the heart rate. In order to ensure that this process is done safely you will be asked to attend the Metabolic Unit at weekly intervals for a period of 6 weeks while the dosage therapy is adjusted. At each visit you will be weighed and you will be asked whether or not you have noticed an increase in breathlessness or a tendency to ankle swelling, either of which would suggest fluid retention. Your blood pressure will be measured carefully and a dose adjustment of your medications may be made. At the end of 6 weeks you will return to the cardiovascular risk clinic to see your referring doctor.

If there are any problems as the dose is changed this will be discussed with one of our doctors.