

Right Bundle Branch Block (RBBB)

Notes:

- Present in about 15% of the normal population.
- If a solitary finding it is not commonly associated with cardiac disease.
- Consider the risk of associated coronary artery disease.
- This risk may be reduced by ensuring there are no related symptoms. If present or there are significant risk factors for coronary artery disease, then a cardiological assessment should be arranged.
- ❖ If the diver has no aggravating factors, I would agree to diving.

HYPERTENSION

High Blood Pressure (BP)

Notes:

- Blood pressure tends to rise with diving due to cold, anxiety, exercise and the fluid shift from the legs.
- Long standing hypertension is associated with ischaemic heart disease, stroke, aortic aneurism, peripheral vascular disease and pulmonary oedema.
- Antihypertensive drugs commonly alter the response of the heart rate and blood pressure to exercise.
- Pulmonary oedema particularly has been shown to rarely be provoked by diving.
- Consider the risk of associated coronary artery disease causing sudden anginal pain or myocardial infarct induced by heavy exercise, (a ? *proven, remote and major* risk).
- This risk may be reduced by ensuring there is:
 - good control of the blood pressure,
 - absence of end organ damage especially left ventricular hypertrophy or dilation,
 - prevention and/or treatment of risk factors for coronary artery disease,
 - supervised exercise program.
- Consider the risk of a stroke occurring whilst diving, (a ? *plausible, rare and major* risk).
- Consider the risk of immersion induced pulmonary oedema, (a ? *plausible, rare and major* risk).
- This risk may be reduced by changing from beta blocker medication.
- Consider the risk of reduced exercise tolerance due to antihypertensive medication, (a ? *proven, regular and moderate* risk).
- This risk may be reduced by checking for an appropriate cardiac response with exercise, especially in those divers who use beta blockers or who are on multiple drugs or who have high drug dosages.
- ❖ I recommend diving if the BP is well controlled, there is no sign of end organ damage and there is a normal cardiac response to exercise. If they are physically unfit I would recommend a supervised exercise program prior to diving.

IMPLANTABLE DEFIBRILLATORS

Notes:

- Used to treat dysrhythmias such as ventricular tachycardia and fibrillation that lead to sudden death. There is a recurrence rate of the dysrhythmia of 30-50% within 2 years.
- They contain air spaces and may be damaged by increases in pressure. Some brands are pressure-tested to shallow depths but this does not imply that they can be safely used whilst diving.
- Consider the risk of the underlying cardiac pathology.
- Consider the risk of the diver having the dysrhythmia whilst diving and, even with a shock, reverting to normal rhythm becoming momentarily faint.
- Consider the risk of the defibrillator being damaged and malfunctioning whilst under pressure.
- ❖ I would not recommend anyone with an implantable defibrillator to dive.

INTRACARDIAC SHUNTS

Notes:

- Intravenous nitrogen bubbles commonly form in the circulation of sports divers on ascent. These bubbles are normally trapped and dissipated in the pulmonary vascular bed. A diver who has an intracardiac shunt which has a right to left flow may therefore be at risk of right to left shunting of venous nitrogen bubbles causing a paradoxical arterial gas embolism. This will depend on the type of shunt:

Atrial Septal Defect (ASD)

Notes:

- With ASDs, even though the net flow is left to right, there are bi-directional flow phases during which right to left shunting of venous nitrogen bubbles may occur.
- Any right to left flow is increased by Valsalva manoeuvres, coughing and body immersion.
- ASDs may close spontaneously and are usually only closed surgically if they are symptomatic.
- Consider the risk of right to left shunting of venous nitrogen bubbles causing an arterial gas embolism, (a ? *proven, remote and major* risk).
- ❖ I do not recommend anyone with an ASD to dive.

Ventricular Septal Defect (VSD)

Notes:

- Flow through VSDs is always left to right so there is no risk of arterial gas embolism.
- Haemodynamically significant VSDs are usually surgically corrected.
- Consider the risk of reduced exercise tolerance because of the left to right shunt, (a ? *possible, remote and moderate* risk).
- ❖ If the diver has a history of good exercise tolerance I recommend diving. If they do not do regular exercise I ask for a cardiological assessment.