THORACIC AORTIC DISSECTION
Supporting information

This guideline has been prepared with reference to the following:

Erbel R, Aboyans V, Boileau C et al. 2014 ESC Guidelines on the diagnosis and treatment of aortic diseases: Document covering acute and chronic aortic diseases of the thoracic and abdominal aorta of the adult. The Task Force for the Diagnosis and Treatment of Aortic Diseases of the European Society of Cardiology (ESC). Eur Heart J. 2014;35:2873-926

http://eurheartj.oxfordjournals.org/content/35/41/2873

Investigations

What proportion of chest x-rays show mediastinal widening in aortic dissection?
A prospective, observational study in 250 patients (von Kodolitsch, 2000) noted mediastinal widening in 97 (76%) of 128 patients who had aortic dissection, and also in 27 (22%) of 122 who did not.
In IRAD (Hagan, 2000), mediastinal widening (>8 cm) and abnormal aortic contour were present in only 50%-60% of cases.

Hagan, PG, Nienaber CA, Isselbacher EM, et al. The International Registry of Acute Aortic Dissection (IRAD). JAMA 2000;283:897-903

von Kodolitsch Y, Schwartz AG, Nienaber CA. Clinical prediction of acute aortic dissection. Arch Intern Med 2000;160:2977-82

Evidence Level: III

What proportion of ECGs in patients with suspected aortic dissection show characteristics of acute coronary syndromes (ACS)? What proportion of patients has a normal ECG?
A blind review of 233 consecutive patients with a final diagnosis of acute aortic syndrome (Biagini, 2007) found ECG results suggestive of ACS in 27%. Such findings were a strong independent predictor of in-hospital mortality.
In a prospective study of 89 patients with acute aortic dissection over a 12-year period (Hirata, 1995) 9 (18%) of 49 Type A patients and 15 (37%) of Type B patients had normal ECGs.
A retrospective study of 159 patients with Type A acute aortic dissection found that 27.0% had normal ECG (Hirata et al, 2010).

Biagini E, Lofiego C, Ferlito M et al. Frequency, determinants, and clinical relevance of acute coronary syndrome-like electrocardiographic findings in patients with acute aortic syndrome. Am J Cardiol 2007;100:1013-9

Hirata K, Kyushima M, Asato H. Electrocardiographic abnormalities in patients with acute aortic dissection. Am J Cardiol 1995;76:1207-12

Hirata K, Wake M, Kyushima M et al. Electrocardiographic changes in patients with type A acute aortic dissection. Incidence, patterns and underlying mechanisms in 159 cases. J Cardiol. 2010;56:147-53
http://www.sciencedirect.com/science/article/pii/S0914508710000614

Evidence Level: III

Immediate treatment

Labetalol should be given if systolic BP>120 mmHg, and for continuing use as IV infusion to maintain systolic BP <=100 mmHg?
Labetalol is useful in aortic dissection because it effectively lowers both the velocity of the left ventricular ejection (dV/dT) and arterial pressure (Isselbacher, 1997). Labetalol may be preferable to the alternative treatment of nitroprusside and propranolol outside of the intensive care setting, being both cost effective and easier to use (Laden, 1990; Banning, 1995). It is important to continue as an IV infusion to reduce stress on the aorta by maintaining BP at a level just high enough to ensure renal, cerebral and myocardial perfusion (Pretre, 1997). Esmolol, an ultra-short-acting beta-blocker, may be preferable to labetalol if significant haemorrhaging creates the risk of sudden hypotension (Mohindra, 1991; O'Connor, 1995).

Banning AP, Ruttley MS, Musumeci F, et al. Acute dissection of the thoracic aorta. BMJ 1995;310:72-3

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http://www.bmj.com/content/310/6972/72

Isselbacher EM, Eagle KA, Descantis RW, in: Braunwald E (ed). Heart disease: a textbook of cardiovascular medicine, 5th ed. Philadelphia: Saunders, 1997. p1564

Laden N, Baciewicz FA, Grubb B. Labetalol and MRI as initial medical and diagnostic modalities in a Marfanoid patient with expanding ascending aortic aneurysm. Chest 1990;98:1290-92

Mohindra SK, Udeani GO. Intravenous esmolol in acute aortic dissection. DICP 1991;25(7-8): 735-8

O'Connor B, Luntley JB. Esmolol is safer than and as effective as labetalol (letter). BMJ 1995;310:875 http://www.bmj.com/content/310/6983/875.3

Pretre R, Von Segesser LK. Aortic dissection. Lancet 1997;349:1461-4

Evidence Level: IV

GTN 50mg in 50ml of sodium chloride 0.9% should be added to the infusion if labetalol alone fails to control BP?

GTN is a potent vasodilator with proven efficacy in angina, myocardial infarction, heart failure and intra/postoperative hypertension (Herling, 1984). GTN is a safer choice than the more widely-used nitroprusside, as the latter increases intracranial pressure and may induce hypotension more often than the alternatives, as well as risking cyanide poisoning in high doses or in patients with renal failure (Kaplan, 1994). Additionally, nitroprusside is light-sensitive and requires careful handling. The explicit evidence in favour of GTN (as compared to other vasodilators) in the treatment of aortic dissection is limited. An overview of treatment in 1992 throughout Scotland (Isles, 1995) found that GTN was considered appropriate for hypertension complicated by acute left ventricular failure, but was little used (1 of 28 respondents) in aortic dissection. A review of drugs used in hypertensive crises (Varon, 1996) suggests that GTN is still widely used because it is inexpensive when compared with other agents. Several studies have been carried out in the setting of intra or postoperative hypertension which demonstrate that GTN is equally or more effective than nitroprusside in this situation (Fremes, 1985; Flaherty, 1982).

Flaherty JT, Magee PA, Gardner TL, et al. Comparison of intravenous nitroglycerin and sodium nitroprusside for treatment of acute hypertension developing after coronary artery bypass surgery. Circulation 1982;65:1072-7 http://circ.ahajournals.org/content/65/6/1072.long

Fremes SE, Weisel RD, Mickle DA, et al. A comparison of nitroglycerin and nitroprusside: I. Treatment of postoperative hypertension. Ann Thorac Surg 1985:39:53-60

Herling IM. Intravenous nitroglycerin: clinical pharmacology and therapeutic considerations. Am Heart J 1984;108:141-9

Isles CG. Management of hypertensive crises. Scott Med J 1995;40:23-5

Kaplan NM. Management of hypertensive emergencies. Lancet 1994;344:1335-8

Varon J, Fromm RE. Hypertensive crises: the need for urgent management. Postgrad Med 1996;99:189-203

Evidence Level: V (In aortic dissection); II (In intra/postoperative hypertension)

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