SIR,—The dangers of intravenous thrombolysis treatment have been comprehensively reviewed by Dr M C Petch.¹ We report a case of haemorrhage induced by streptokinase successfully treated with intravenous tranexamic acid. Tranexamic acid inhibits plasminogen activation and thrombus fibrinolysis and is referred to in the *British National Formulary* for use in streptokinase overdosage.

A 58 year old man with severe ischaemic heart disease presented with chest pain and electrocardiographic changes characteristic of myocardial infarction. One hour after receiving streptokinase he developed haemoptysis, haematuria, and progressive focal neurological signs suggesting right cerebral haemorrhage. He was treated with intravenous tranexamic acid (1 g by slow intravenous infusion six hourly). The haemorrhage ceased after the first infusion, and his neurological signs resolved over two days.

Aprotinin and fresh frozen plasma are useful in reversing the coagulopathy subsequent to giving streptokinase,² and tranexamic acid should be evaluated as an immediate antidote to streptokinase. These agents may be of great value used in conjunction when streptokinase has been given inappropriately or dangerous bleeding has occurred.

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- 1 Petch MC. Dangers of thrombolysis. *Br Med J* 1990;300:483-4. (24 February.)
- 2 Butler J, Davies AH, Westaby S. Streptokinase in acute aortic dissection. *Br Med J* 1990;300:517-9. (24 February.)

SIR,—Few would argue with Dr M C Petch's main conclusions,¹ but one aspect of the dangers of streptokinase deserves further emphasis. The increasing use of streptokinase has been associated with a proliferation of reports of a serum sickness type of reaction to the drug.^{2,9} Many of the reported patients had cutaneous vasculitis or impairment of renal function, or both, so these reactions cannot be dismissed as "mild." There are close antigenic similarities between group A streptococci, which includes the major human pathogen *S pyogenes*, and group C streptococci, from which streptokinase is produced.¹⁰ A recent study of patients receiving streptokinase showed that plasma taken before treatment contained low levels of neutralising capacity for the drug, suggesting the presence of pre-existing antibodies.¹¹ Streptococcal infections are common, and there is likely to be a large reservoir of sensitised people in the community; as the use of streptokinase increases the serum sickness type of reactions are likely to be increasingly recognised. Consideration of cost is obviously important in choice of thrombolytic agent, but infusing large amounts of a highly antigenic bacterial protein into sensitised patients is likely to generate many more cases like those discussed above.

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SIR,—In his editorial Dr M C Petch describes the now well defined contraindications to thrombolytic treatment and reminds us that the benefits of this treatment outweigh the risks. We suggest that recent pancreatitis is included in the list of cautions.

A 47 year old man was admitted to the coronary care unit with a four hour history of severe retrosternal chest pain and electrocardiographic changes of an acute inferolateral myocardial infarction. He was included in a randomised study of thrombolytic agents and was treated with anistreplase (APSAC). The patient was known to have had alcohol related acute pancreatitis. A recent abdominal ultrasound examination had shown a 5 cm pseudocyst within the body of the gland, but this information was not immediately available to the admitting doctors.

Two hours after admission he developed severe central abdominal pain and became progressively more shocked, having been normotensive on admission. A Swan-Ganz catheter was inserted for haemodynamic monitoring, and the pulmonary arterial wedge pressure confirmed hypovolaemia with a pressure measurement of less than 5 mm Hg. Serum amylase was raised at 960 U/l (normal range <200 U/l), strongly suggesting a diagnosis of acute pancreatitis. Despite attempted resuscitation with fresh frozen plasma and 5 litres of intravenous colloid he remained hypotensive and anuric and died 15 hours after admission.

Postmortem examination showed changes of a recent myocardial infarction in association with multivessel coronary atheroma. No intracoronary thrombosis was detected, and there was interstitial infarct haemorrhage in keeping with reperfusion due to thrombolysis. The peritoneal cavity contained 3.5 litres of blood, and there was an extensive retroperitoneal haematoma constituting the contents of a pseudocyst of the body of the pancreas. The residual pancreas was not enlarged but had flecks of fat necrosis around its head. Although no specific site for the haemorrhage could be identified within the pseudocyst, this was considered to be the source of the intraperitoneal bleeding.

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SIR,—Given the expertise in, and commitment to, the management of cardiothoracic emergencies that Mr S Westaby and his colleagues are known for, one is loathe to criticise their recent paper.¹

There is one point, however, that as a radiologist I feel merits comment. They say in their paper that "aortic dissection should have been considered on the basis of the chest x ray appearance in all four cases." There are severe limitations to the chest x ray in the diagnosis of aortic dissection. Ectatic great vessels, "unfolded aortic arch," mediastinal fat, patient rotation or scoliosis, poor inspiratory effort by the patient, an x ray taken with the patient

supine—all can give a true or spurious impression of mediastinal widening. The vast majority of patients with a wide mediastinum or chest x ray will not have aortic dissection. Other chest radiological signs in favour of aortic dissection are often not present. I agree that serial chest x rays or review with previous comparable films, or both, are useful. A measure of the difficulty in interpreting chest x ray films in patients suspected of acute aortic dissection can be gauged from the very modest widening of the mediastinum seen in figure 2 in the paper—it is of a degree often seen in a "reporting pile."

The decision to undertake computed tomography out of hours is likely to result in a delay of one hour and possibly longer, which may well diminish the potential benefit of streptokinase if the patient actually has had a myocardial infarction and not an aortic dissection. Moreover, were computed tomograms done in many patients with acute chest pain simply because of a "wide" mediastinum, not only would some suffer from delayed administration or non-administration of streptokinase but the computed tomography department would be overrun with requests for a condition which the Pittsburgh University's *Manual of Diagnostic Imaging* estimates occurs in one in 10 000 hospital admissions.²

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- 1 Butler J, Davies AH, Westaby S. Streptokinase in acute aortic dissection. *Br Med J* 1990;300:517-9. (24 February.)
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Benefits of animal research and the doctor's responsibility

SIR,—Having spent a great part of my career doing animal experiments, I am dismayed by the number of my distinguished colleagues who refuse to acknowledge that such use of animals is subject to any moral reservations. Sir Michael Drury and his seven colleagues¹ suggest that patients should, when they receive their prescriptions, be persuaded that animal experiments are justified by the medical advantages they are getting the benefit of, and that these blessings would not be available to them if such experiments had been disallowed. The first proposition instances the moral defection implied in "ends justify means"; the second proposition is logically unsustainable.

Contrary to the absurd propaganda of strict antivivisectionists, it is undeniable that animal experiments have played a very large part in the development of many modern therapeutic resources. But it underrates the ingenuity of researchers to assert that medical progress would have been seriously impeded had animal experiments been illegal, although a different strategy would have been required. It is the skill of the scientist to find a way round the intellectual, technical, and ethical limitations to investigation. No one complains, surely, that we have been denied the benefit of potential advances by prohibiting experiments on unsuspecting patients, criminals, or idiots or that embryo research will be brought to a standstill by application of the 14 day rule.

Your earlier correspondent on this topic, Sir Walter Bodmer, decries "speciesism" as an "extraordinary concept" and a "peculiar philosophy."² Speciesism is, in fact, a perfectly valid moral indictment that is in the reforming spirit of the times, which is to extend more widely the respect and protection deserved by previously exploited creatures, human or animal. All moral innovators have been impolitely branded as cranks in their time.