- 3 Kelly R, Warke T, Steele I. Medical restrictions to driving: the awareness of patients and doctors. *Postgrad Med J* 1999;75:537-539.

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Serious hyperkalaemia after short use of low molecular weight heparin in a diabetic patient

A 45-year-old lady was admitted to our unit with right calf pain and a provisional diagnosis of deep vein thrombosis (DVT). She also had type 1 diabetes, hypertension and previous recurrent DVT as well as seronegative rheumatoid arthritis. Her medication on admission included warfarin, human insulin, colchicine, lansoprazole and lisinopril. The right calf was a little swollen and tender; Homan's sign was negative. She was treated provisionally as suspected DVT with dalteparin. Her renal, hepatic and calcium levels were normal at the time of admission, as was her full blood count. Four days after admission her serum K had risen to 6.0 mmol/l from 4.4 mmol/l at the time of admission; this rose to 7.1 mmol/l on the following day. Because the electrocardiogram (ECG) showed a peaked T-wave and widened QRS complex, the hyperkalaemia was treated as an emergency with insulin, dextrose infusion and followed by calcium resonium. Both

lisinopril and dalteparin were stopped. On the same day the Doppler ultrasound scan did not confirm DVT. The patient was maintained on calcium resonium and serum K was monitored daily. One week later the serum K remained below 5.0 mmol/l.

Hyperkalaemia is more common in patients with diabetes and this can become worse by the use of drugs, especially angiotensin converting enzyme inhibitors and potassium-sparing diuretics.¹ The exact mechanisms for susceptibility of diabetic patients to develop hyperkalaemia is not well understood, but insulin deficiency/resistance,² hyporeninaemic hypoaldosteronism³ or reduction in Na⁺-K⁺ ATPase activity⁴ has been proposed.

On the other hand hyperkalaemia is a recognised side effect of heparin therapy,⁵ however, this is rare in those who had treatment for less than seven days, in which case regular monitoring of serum K⁺ is recommended by the Committee on Safety of Medicines. This unwanted effect is thought to be more common in patients with diabetes mellitus.⁶ The mechanism of heparin-induced hyperkalaemia is related to inhibition of aldosterone secretion by heparin.

This case represents an unusual presentation of acute hyperkalaemia occurring shortly after starting treatment with the low molecular weight heparin dalteparin (Fragmin) in a diabetic patient who is concomitantly taking an ACE inhibitor. Low molecular weight heparin is increasingly used in hospitalised patients as well as outpatients. Patients with diabetes will be

more likely to develop serious hyperkalaemia in these circumstances, as illustrated by this case. We recommend that patients with diabetes should have their potassium level monitored closely even if the duration of anticoagulant therapy is less than seven days.

We have reported this incident to the Medicine Control Agency and the manufacturer.

References

- 1 Jarman PR, Kehely AM, Mather HM. Hyperkalaemia in diabetes: Prevalence and association. *Postgrad Med J* 1995;71:551-2.
- 2 Schalwitz RA, Gingerich RL, McGill JB, McDonald JM. Effect of hyperglycaemia on plasma sodium and potassium concentration revisited. *Clin Chem* 1991;37:293-4.
- 3 De Fronzo RA. Hyperkalaemia and hyporeninaemic hypoaldosteronism. *Kidney Int* 1980;17:118-34.
- 4 Mimura M, Makino H, Kanatsuka A, Yoshida S. Reduction of erythrocyte (Na⁺-K⁺) ATPase activities in non-insulin dependent diabetic patients with hyperkalaemia. *Metabolism* 1992;41:426-30.
- 5 Gonzalez-Martin G, Diaz-Molinas MS, Martinez AM, Ortiz M. Heparin-induced hyperkalaemia: a prospective study. *Int J Clin Pharmacol Ther Toxicol* 1991;29:446-50.
- 6 Busch EH, Ventura HO, Lavie CJ. Heparin-induced hyperkalaemia. *South Med J* 1987;80:1450-1.

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