A method for measurement of dynamic middle cerebral artery pressure in a rat stroke model

D. McLeod, M. Calford and N. Spratt, Biomedical Science, University of Newcastle, Callaghan, NSW 2308, Australia.

There are no current ischaemic stroke models in rodents that have the capability of measuring intracerebral haemodynamics on a beat-by-beat basis. The present study describes a microcatheter-based model for measurement of middle cerebral artery (MCA) pressure in rats combined with blockade of blood flow through the MCA. The catheter device consists of a heat-blunted 5-0 monofilament thread (tip diameter 330 μm) that is introduced into a polyimide microtube (outer diameter 350 μm, length 30mm). The microtube with inserted thread is then secured to a 10 cm length of 1F silicone tube with epoxide glue. The catheter device is then filled with heparinised saline and connected to a fluid filled pressure transducer and data acquisition system. To induce MCA occlusion (MCAo), the catheter is introduced *via* the external carotid artery and internal carotid artery to simultaneously block blood flow to the anterior cerebral artery (ACA) and MCA. The lumen of the catheter sits at the bification of the ACA and MCA for measurement of MCA pressure. In the present pilot study MCA pressure, femoral arterial pressure and HR were simultaneously measured for 2 hours following micro-catheter MCAo in spontaneously hypertensive (SH) (n =1) and outbred Wistar rats (n=1) under isoflurane anaesthesia. In both rats, systolic femoral arterial pressure was identical to systolic blood pressure (BP) measured by the microcatheter when initially inserted into the common carotid artery, prior to MCAo. In the SH rat, the micro-catheter systolic BP fell from 145 mmHg to 39 mmHg on MCAo, and from 104 mmHg to 39mmHg in the Wistar rat. This is the first study to measure dynamic changes in MCA pressure in a rodent stroke model.