Sensibility during slaughter without stunning in cattle

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IN almost four decades and in many locations in these islands, I have had the privilege of and responsibility for animal welfare in many contexts, including serving as an OVS and OV in ritual slaughter plants.

The following matter needs to be addressed. In his seminal works on the circulus arteriosus in Cerebri Anatome in 1664 and De Anima Brutorum in 1672, Thomas Willis described the blood supply to the base of the brain in a number of animal species and, more importantly, founded the discipline of clinical neuroscience. The detailed comparative physiology and species differences between ovine and bovine brain vascular supply were further elucidated by Baldwin and Bell (1963a). They described the vascular supply to the calf's brain from the carotid and the vertebral arteries. The common carotid bifurcates to give the larger external carotid, which becomes the internal maxillary; this supplies the (carotid) rete mirabile. The other part of the bifurcation in the immature calf is the internal carotid, which reduces in size as the animal matures, and also supplies the (carotid) rete mirabile. In all cases, the (carotid) rete mirabile supplies the circle of Willis via the residual portion of the internal carotid. The vertebral artery via the basioccipital plexus supplies the (carotid) rete mirabile and via the residual internal carotid empties into the circle of Willis. When the calf's carotid arteries are severed by the ritual cut, it appears that the vertebral artery has two possibilities of supplying the circle of Willis through the rete mirabile, mainly by the basioccipital plexus with a lesser alternative supply via the occipitovertebral anastomosis, thence to the external carotid and the internal maxillary artery to the rete mirabile and finally to the circle of Willis.

This is significant in the ritual slaughter without stunning of young calves and other bovids, because of prolonged clinically assessed sensibility during ritual slaughter (permitted under the Welfare at Slaughter and Killing Regulations 1995). The importance of the circle of Willis in the context of ritual slaughter will continue into the foreseeable future. This is because ritual methods are also derogated from the stunning requirement in the new Council Regulation (EC) Number 1099/2009 (subject to a caveat: ‘a certain level of subsidiarity’ is allowed ‘to each Member State’). More significantly, the right to conduct ritual slaughter of animals is enshrined in Article 10 of the Charter of Fundamental Rights of the European Union. This means stunning before or after the ritual cut is not a legal requirement. Bleeding from the ritual severance of the carotids alone is a method of killing allowed by derogation from the legal requirement to stun.

Clinical observations by Gregory and others (2010) in 174 older cattle have shown that 8 per cent of non-stunned halal-slaughtered cattle stand for over 60 seconds after the cut. On the basis of my own observations of 100 calves, the average interval between the ritual cut and insensibility was 120 seconds. However, a significant number took longer. Some needed three minutes; one, a calf, took over six minutes and another took five minutes to reach clinical insensibility. There was an important difference between these studies: the older cattle were cut in the standing position and released from the restraining pen immediately, whereas the calves were manually held down upon the cradle before the ritual cut. It appeared that struggling against restraint, either mechanical or physical human strength in the case of calves, accelerated death.
The position in which the head is held also may accelerate death. Significantly, there is a possibility that, once the insensible calf is shackled by its hindlimb and hoisted aloft in an inverted position, gravitational forces may produce a fresh surge of blood to resupply the circle of Willis, thus re-establishing consciousness. This is much like the procedures in lambing and calving to initiate respiration and sensibility in freshly born calves and lambs. The possibility of recovery of sensibility in calves is redolent of Willis in 1650: whereupon intending to dissect the cadaver of the hanged Anne Green, his clinical acumen alerted him to her true physiological state and he managed to revive her (Molnar 2004).

A general observation in these Holstein-Friesian calves, which have little if any neck fat, was clearly obvious severed cardiac ends of ballooned/clotted carotids from 40 seconds after a ritual cut. The remarkable elasticity of the carotids of these suckling calves could be a significant factor in the ballooning/clotting of these vessels. Their carotids and clots appear much larger in relation to their total body mass than those of older cattle, where the ballooned/clotted cardiac extremity carotids are much less obvious. The beating of the heart was easily palpable through the calf's thoracic wall, and was vigorous in the long-surviving animals.

Respiration continued in a number of insensible calves. The palpebral reflexes were initially strong in all calves, enduring markedly in the longest survivors. One calf that became rapidly insensible was found to have gross lung pathology. These calves were on average six weeks old. All ritual practitioners were most highly skilled, with the sharpest cutting instruments. Management and all personnel were aware of and sensitive to the welfare of the animals, and actively participated in the amelioration of individual animals' situations.

These clinical observations on calves and those of Gregory and others (2010) in older cattle raise questions about the use of the carotid cut as the sole method for the production of rapid insensibility in bovids, especially in calves. Adams and Sheridan (2008) quote a calf EEG lasting 680 seconds in these circumstances. The physiological studies of Baldwin and Bell (1963b) on calves predicted these prolonged survivals.

Adams and Sheridan (2008) give a figure of eight seconds to insensibility using the thoracic stick to sever the brachiocephalic trunk in bovids. This stick is used as the last stage of high-speed mature cattle halal killing in New Zealand, following the initial legally required electric stunning. This is followed by a halal ritual carotid cut and a brachiocephalic severance, all within 20 seconds. The brachiocephalic severance as a sole method would be unconscionable on calf welfare, ritual and human health and safety grounds. Pre-ritual cut stunning would be the best solution from a calf welfare perspective. Post-ritual cut stunning, which was and is administered within an interval of five seconds after the ritual cut, is and was accepted by some ritual practitioners.

British Veterinary Association

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