Traditional Halal Slaughter from Scientific Perspectives

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Abstract

Halal slaughtering process is the killing and butchering of non-forbidden animals for food. According to Islamic tradition, the conventional method used to slaughter the animal involves cutting the large arteries in the neck along with the esophagus and trachea with one swipe of non-serrated blade. Muslims argue it provides a relatively painless death and helps to effectively drain blood from the animal. Scientifically, the main purpose of effective and humane slaughtering is to remove the flowing blood as quickly as possible and stop the delivery of oxygen to the brain. Blood is suitable for microbial growth environment. Inadequate bleeding could cause more blood to be retained in the meat. Consequently, this would lead to multiplication of spoilage microorganisms and acts as a carrier for food borne pathogens. The main concern of some veterinary and animal rights groups is that halal slaughter without stunning may delay the commencement of unconsciousness and this could result in suffering from stress and pain. Recently, it has been suggested that performing the cut at the first cervical vertebra compared to the conventional cut at the second or fourth cervical vertebra will almost eliminate false aneurysm development and this will reduce subsequent distress. It is possible that when religious slaughter is done faithfully and properly, the welfare of the slaughtered animal is not compromised, even if this cannot be verified scientifically using currently available instruments.

Keywords - halal slaughter, animal welfare, bleeding, meat quality.

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Introduction

There are many slaughter procedures that religions and cultures use around the world. The two that are commercially relevant are the halal and kosher methods practiced by Muslims and Jews respectively. The global trade in red meat and co-products from animals slaughtered using these two methods is substantial and growing (Farouk et al., 2014). Halal slaughter of edible animals for food is a ritual of the shari'ah that purifies an animal from blood and filth thereby making it good and wholesome for human consumption. Despite its short duration, halal slaughtering is a vigorous step in the production of halal and thoyyib (acceptable and wholesome) meat for Muslim consumption (Nakyinsige et al., 2014). Accordingly, Muslim consumers reflect the importance of spiritual considerations over any other factor in determining the quality of meat and when purchasing meat for their consumption (Nakyinsige et al., 2013).

Humane slaughtering concerns being sympathetic for the animals being killed for meat production through minimizing animal suffering and respect for animals' intrinsic worth. This is probably what Prophet Muhammad (peace be upon Him) preached when he said: "*Allah calls for mercy in everything, so be merciful when you kill and when you slaughter; sharpen your blade to relieve its pain.*" (Al-Qaradawi, 1994). Islam places great emphasis on humane treatment of animals, especially before and during slaughter. Some of the conditions, to mention but a few, include giving the animal proper rest and water, avoiding conditions that create stress, not slaughtering an animal in front of others of its kind, not sharpening the knife in front of the animals and using a very sharp knife to slit the throat. It is important to acknowledge that Islam respects the intrinsic worth of animals and teaches animal welfare.

When the animals are slaughtered without stunning, any delay between the cut to the neck and the onset of unconsciousness could result in suffering from: stress and pain associated with restraint (Berg & Jakobsson, 2007); pain associated with the cut and stimulation of nociceptors in the wound (Gibson, et al., 2009; Zulkifli, et al., 2014); and distress associated with delays in the time to loss of consciousness (Gregory et al., 2010). It has been recommended that practices such as restraining the animal in a comfortable position, using a very sharp knife, monitoring the interval from the cut to loss of sensibility, and the slaughtered animals must be unconscious before removal from the restrainer could improve animal welfare during slaughter without stunning (Grandin, 2010). Therefore, the paper reviews the considerable possibility for development and improvement with regard to management of the implicated risks for traditional halal slaughter method.

Importance of Bleeding

The main purpose of effective and humane slaughtering is to remove the flowing blood as quickly as possible and stop the delivery of oxygen to the brain (Gregory, 2007). From the Islamic prospective, the blood should not be consumed because it is considered as an impure substance. Ali et al. (2007) documented that one of the main goals of meat processing industry is to improve the bleeding and reduce meat flaws, as optimized bleeding can enhance the quality of meat during storage. Blood is suitable for microbial growth environment. Inadequate bleeding could cause more blood to be retained in the meat. Consequently, this would lead to multiplication of spoilage microorganisms and acts as a carrier for food borne pathogens (Lerner, 2009). Furthermore, remaining blood in the meat equalizes to retention of more haemoglobin. Alvarado et al. (2007) mentioned that haemoglobin is a dominant supporter of lipid oxidation. Lipid oxidation composes a key reason of non-microbial meat spoilage, particularly during cooking, refrigeration and freezing storage (Soyer et al., 2010).

One of the main conditions of halal slaughtering is that the neck is partially cut without head decapitation leaving the spinal cord intact and the body should be released immediately after slaughtering. In birds, it has been reported that decapitation disrupts the nervous system causing asphyxia and suffocation and increased time of death. Conversely, cutting the carotid artery, jugular vein, esophagus and trachea without decapitation shortens the time of death (Davis, 1996). The study by Zaman et al. (2012) investigates the variation of total protein profile in chicken skeletal muscle as influenced by two methods of slaughtering using 2-D gel electrophoresis. The results show that the protein with MW 116 kDa was present only in chickens where the neck was completely cut off and body tied at the point of death compared to the other situation where the neck was partially cut leaving the spinal cord intact and the body was released immediately after slaughtering. One of the possible candidate for this protein to be the 20S catalytic subunit of the enzyme acetylcholine esterase (AChE) having Mw 110 kDa (Tsim et al., 1988). AChE is found at mainly neuromuscular junctions and cholinergic brain synapses where its activity helps to terminate neurotransmission (synaptic transmission).

Welfare Concerns for Halal Slaughter Without Stunning

Welfare issues put forward by individuals concerned for animal welfare during slaughter without stunning include stress of the restraint, whether the cut is painful and whether the animal experiences excessive distress while bleeding and the potential of the onset of complete insensibility. The main concern of some veterinary and animal rights groups is that halal slaughter without stunning may delay the commencement of unconsciousness and this could result in suffering from stress and pain (Grandin & Regenstein, 1994; Gregory et al., 2010; Zulkifli et al., 2014). It has

been reported that the carotid arteries of the cattle slaughtered by halal method are susceptible to develop false aneurysms at the severed cardiac ends (Gregory et al., 2008) which could lead to delay the commencement of unconsciousness (Gibson et al., 2009; Gregory et al., 2010). Recently, Gregory et al., (2012) suggests that performing the cut at the first cervical vertebra compared to the conventional cut at the second or fourth cervical vertebra will almost eliminate false aneurysm development and this will reduce subsequent distress.

Pre-slaughter Stunning

In developed countries there is a legal requirement to render the animals instantly insensible to pain prior to slaughter. This is achieved by using mechanical or electrical equipment or by narcosis using gases such as carbon dioxide. Pre-slaughter stunning of animals using electrical shock is permissible in some Islamic authorities if it meets some provisions like the position of electrodes, voltage range, electrical current range and period, type of machine and electrodes used. There should be provision of adequate training for the slaughterers. Head only electrical stunning, non-penetrative captive bolt stunning and water bath stunning of poultry have been approved by many Islamic authorities as long as the method is reversible (Nakyinsige et al., 2014). According to the Department of Islamic Development Malaysia (JAKIM) stunning is not recommended. However, if stunning has to be carried out, the permitted methods are electrical or pneumatic percussive stunning. The use of stunning equipment shall be under the supervision of a trained Muslim and periodically monitored by competent authorities. In addition, the stunning should not kill or cause permanent physical injury to the animals and the stunners which are used to stun the animals under *mughalazah najs* category should not be used to stun animals for halal slaughter (Department of Standards Malaysia, 2009). The guidelines on stunning parameters are as specified in Table 1 and 2.

Type of Livestock	Weight (kg)	Current (A)	Voltage (V)	Duration (s)
Chicken	2.40- 2.70	0.20- 0.60	2.50- 10.50	3.00- 5.00
Bull	300- 400	2.50- 3.50	300- 310	3.00- 5.00

Table 1: Guideline Parameters for Electrical Stunning of Chicken and Bull

Note: Electrical current and duration to be determined and validated by the organisation, taking into account the type and weight of the animal and other varying factors.

Source: Halal food—production, preparation, handling and storage standards—general guidelines. MS 1500:2009. pp.13.

Type of Livestock	Current (A)	Duration (s)
Lamb	0.50–0.90	2.00–3.00
Goat	0.70–1.00	2.00–3.00
Sheep	0.70–1.20	2.00–3.00
Calf	0.50–1.50	3.00
Steer	1.50–2.50	2.00–3.00
Cow	2.00–3.00	2.50–3.50
Buffalo	2.50–3.50	3.00–4.00
Ostrich	0.75	10.00

Table 2: Guideline Parameters for Electrical Stunning of Other Animals

Note: Electrical current and duration to be determined and validated by the organisation, taking into account the type and weight of the animal and other varying factors.

Source: Halal food—production, preparation, handling and storage standards—general guidelines. MS 1500:2009. pp.13.

Animal Welfare Concerns for Slaughter Without Stunning

Based on observations in over 50 halal and kosher plants where stunning is not allowed, Grandin (2010) recommends the following practices should be used to reduce the pain and distress of the animals during the throat cut without prior stunning which eventually improve animal welfare.

- Restrain the animal in a comfortable, upright position.
- Use a very sharp knife that is twice the width of the neck.
- Time the interval from the cut to loss of consciousness.
- Cattle, sheep and goats must be unconscious before removal from the restrainer.

How to Harmonize Spiritual and Temporal Views

The transformation of an animal into pieces fit for human consumption is a very important operation. Industrial production of high-quality meat must meet the various demands of consumer groups and food safety regulators. There is an urgent need to harmonize pious spiritual views with those that are temporal or corporeal and which are based on scientific evaluation. A major area of argument is the slaughter of

animals without stunning prior to throat slit and bleeding. This practice is permissible in many countries but it is really contentious with regards to animal welfare. Areas of concern include the stress of restraining the animal, whether the cut is painful and whether the animal experiences excessive distress while bleeding out, such as the aspiration of blood into the lungs. It is possible that when religious slaughter is done faithfully and properly, the welfare of the slaughtered animal is not compromised, even if this cannot be verified scientifically using currently available instruments. On the other hand, supporters of non-stunning methods need to acknowledge that some commercial production facilities have poorly trained slaughtermen and unacceptable animal restraint systems that cause unnecessary animal suffering. Scientific methods that have proven to conform with religious requirements must be adopted in order to improve animal welfare and to produce meat of high quality.

Conclusion

The debate regarding the welfare aspect of slaughter without stunning goes on. The quest should continue in order to ensure that the process of traditional halal slaughter is as humane as possible for the sake of animal welfare. There is substantial possibility for development and improvement with regard to management of the implicated risks for halal slaughter without stunning. Additional indicators during neck cutting without stunning to determine final loss of consciousness and actions to be taken in cases of prolonged consciousness are also needed. Therefore, further research on the socio-technical aspects of animal slaughter which may bring about the production of quality halal meat is recommended.

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