



Literature Review on the Welfare Implications of Thoracic Compression

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WHAT IT IS?

Thoracic compression is the application of pressure to an animal's chest to prevent respiration and/or cardiac movements to cause death. This technique is used in some field research settings to terminate the life of small wildlife (birds and mammals).

WHY IS IT USED?

Thoracic compression is presented as technically easy to use, rapid and painless by proponents. The advantages of thoracic compression are that it requires no equipment or materials and allows the researcher to collect specimens with undamaged skin and potentially intact bones; tissues or fluid samples that are potentially unaltered; and/or intact archival samples of wildlife for morphologic and other studies.

THE ISSUE

The exact cause of death as resulting from thoracic compression has not been demonstrated, which is a key datum for assessing the degree of pain and/or distress experienced by the animal. It is widely believed that death is a direct result of cessation of breathing, specifically asphyxia leading to hypoxia (a.k.a. suffocation, compressive asphyxia, traumatic asphyxia). As a result, critics of the method conclude that animals undergoing it experience a period of pain and distress.

For example: The Association of Avian Veterinarians states that thoracic compression is “*akin to suffocation of mammals*” and “*cannot be considered humane*”.¹ Individual veterinarians have expressed similar positions based on the belief that thoracic compression does not stop the heart.² And, ethicist Bernard Rollins (2009) states that “*suffocating birds using thoracic compression (crushing the chest)*” is currently “*unthinkable*” as a method of euthanasia.³

CRITICAL WELFARE ISSUES

Asphyxia versus cardiac arrest--Winker (2000) asserts that thoracic compression “... *instantly stops the heart and lungs, and must cause blood pressure to skyrocket. For small birds, it seems that unconsciousness occurs instantly; death follows very quickly.*”⁴ Should this assertion that death results from cessation of cardiac function be empirically substantiated, this may justify consideration of the technique as a means of euthanasia.

Larger mammal species and human accident victims subject to thoracic compression do not seem to experience heart failure as their primary cause of death.^{5,6} However the heart and lung anatomy of small mammal and especially birds differ significantly from these species, and their cause of death when subject to this technique has not been objectively determined. Data relating to the onset of unconsciousness would also be of value.

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Large versus small animals and field conditions-- It is generally acknowledged that thoracic compression is not appropriate for large animals (including large birds).⁷ While field conditions can be exceptionally challenging, there is no clear basis for the argument that small animals have a lesser capacity to suffer pain and distress, or that acquisition and portage difficulties relating to equipment and supplies required for euthanasia of small animals are prohibitively greater than those already encountered during the study of larger species.

REFINEMENTS

Anesthesia--Conscious experience of thoracic compression may, in some situations, be eliminated through the use of general anesthesia. Researchers may face challenges in transporting related equipment into remote locations, and in legally obtaining and/or transporting drugs for euthanasia. Acquisition of inhalant or injectable agents can be difficult where the expense of DEA licensure for biologists, unwillingness of veterinarians to accept legal responsibility for drugs, transportation restrictions on agents, or jurisdictional boundaries present challenges. However, in some cases the equipment needed is minimal and access to anesthetics might be facilitated by veterinarians local to the research area.

Technique—In conjunction with the collection of validating data, this technique would benefit from precise characterization and standardization.

ALTERNATIVES TO THORACIC COMPRESSION

The relative merits of alternatives to thoracic compression should be weighed with consideration to time until unconsciousness, presumed pain and distress associated with each method, and practical concerns. Euthanasia of small birds and mammals can be reliably provided using an overdose of barbiturates or anesthetic, or use of an inhalant anesthetic to induce unconsciousness⁸ followed by a physical method, such as thoracic compression or cervical dislocation. Decapitation of small birds exsanguinates as well as dislocates effectively ensuring immediate death. Carbon dioxide, carbon monoxide, and inert gases may cause death by similar mechanisms as thoracic compression, but the pain presumed to be associated with thoracic compression is absent. Therefore, these methods are recommended whenever possible or reasonably practicable.

RELEVANT POLICIES AND PUBLIC POSITION STATEMENTS

American Society of Mammalogists, The: *“Although euthanasia of small mammals in field settings can be accomplished using any of the techniques approved by the AVMA, field settings pose additional challenges because use of injectable controlled substances or inhalants can present additional risks to investigators and stress to the animals. Thoracic compression offers an acceptable alternative under these conditions.”⁹*

Association of Avian Veterinarians: *“The AAV finds that the use of thoracic compression is an unacceptable method of euthanasia.”¹⁰*

Canadian Council on Animal Care: *“the degree of stress associated with the procedure is unknown, and it should be used only where other methods are not acceptable for the scientific goals of the study, and with the approval of the local ACC [Animal Care Committee].”¹¹*

Ornithological Council, The: *The realities of field situations often require mechanical means of dispatch. This technique, known as thoracic compression, results in a very rapid loss of consciousness, with death following soon after.”¹²*

National Wildlife Rehabilitators Association: *“Methods which are not approved for use in wildlife are: ... Thoracic compression”¹³*

American Association of Zoo Veterinarians: *“...this method of euthanasia is not recommended due to concerns about the efficacy, prolonged duration of the procedure, the potential for distress of the bird, and the perception of pain.”¹⁴*

OTHER CONSIDERATIONS

Institutional Animal Care and Use Committees (IACUCs) are understandably reluctant to approve methods that are not established as acceptable or acceptable with conditions within the AVMA Guidelines for Euthanasia. However, when scientifically justified, the IACUC has and should employ the authority to approve killing techniques not listed as recognized forms of euthanasia. This might include approving thoracic compression where it represents the most humane option available or practicable, or approving the use of drugs with analgesic properties that may not be scheduled drugs.

Over the last decades, decision making processes have moved towards a precautionary approach of avoiding the use of techniques where 1) the nearest equivalent practice would cause suffering in humans and/or 2) the technique *might* cause suffering in the target species and there is no scientific evidence to the contrary.^{15,16,17} To date, there is a lack of research into the merits and demerits of thoracic compression.

CONCLUSION

In the absence of empirical evidence, thoracic compression cannot be assumed to reliably produce a rapid death or one with minimal suffering, and is thus not deemed to be a method of euthanasia at this time. *However*, thoracic compression should not be prohibited where its use is necessary to minimize animal suffering or is scientifically justified (such as under the oversight of an Institutional Animal Care and Use Committee).

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