

IMPORTANCE OF LYMPH NODE INSPECTION IN PIGS AT A SLAUGHTERSLAB IN LUSAKA, ZAMBIA

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Abstract – The lymphatic system of the pig is practical for and of prime importance in meat inspection. Furthermore, lymph node examination is globally accepted as being an effective meat inspection procedure. The purpose of this study is to investigate the significance of lymph node inspection, especially that of mandibular lymph nodes (*Lymphocentrum mandibulare*) and tracheobronchial lymph nodes (*Lymphocentrum bronchiale*), in pigs at a slaughter slab in Lusaka, Zambia. The slaughter slab in Chibolya was visited in August 2012. Lymph node changes were examined both at the slaughter slab grossly and in the laboratory by the routine histological procedure. A total of 100 lymph nodes (50 each) were examined. In 50 mandibular lymph nodes, 4 granulomatous lymphadenitis, 39 lymphadenitis, and 1 abscess were noted. In 50 tracheobronchial lymph nodes, 2 granulomatous lymphadenitis and 31 lymphadenitis were noted. The gross pathological changes of the lymph nodes mostly reflected on the histopathological changes and the histopathology facilitated correct diagnoses. Microscopic examination was necessary to differentiate lymphadenitis from other causes of gross nodal enlargement. The results highlight the need for introducing both gross and microscopical lymph node inspection at slaughter slabs and for improving the awareness of butchers and swine traders in regards to the importance of these inspections.

Key Words – Meat inspection, Pig, Slaughter slab, Zambia

I. INTRODUCTION

In Zambia, the market in pork meat has been growing annually [1]. During the year 2011, 10,098 cattle, 1,302 sheep, 15,190 pigs and 371 goats were inspected at five modern abattoirs (Kembe Cold Storage, Real Meat Company, Best Beef Abattoir, Grand Butcheries Abattoir and King Quality), and the pigs were found to comprise 57% of the total [1].

Under Zambian law, "abattoir" is defined as a place provided by the Government or by the Local Authority or approved by the Local Authority for the slaughter of animals intended for sale for the food of man and includes all buildings, lairs, stalls and spaces within the abattoir site. However, in common with other developing countries, three kinds of slaughter premises exist in Zambia: modern abattoirs, old slaughterhouses, and slaughter slabs and makeshift premises [2]. The five abattoirs mentioned above with written statistical records available, all belong to the modern abattoir category. The third category, makeshift slaughter premises, includes a wide variety of locations such as converted buildings or rooms, shade areas under trees as well as open bareground that a butcher or a community may find convenient for the operation. Mostly private-owned and under no formal authority or licensing, these premises and their products are neither inspected, quantified nor subjected to trade and health regulations. Makeshift slaughter premises are characteristic of village and rural locations. However, they may also be found in the suburbs or on the fringes of larger towns. In the case of the latter, they are sometimes considered to have links with illegal livestock trading and the slaughter of sick and diseased animals. In Lusaka, the capital of Zambia, we were able to identify only one slaughter slab, located in Chibolya. Abattoirs provide an opportunity for detecting diseases of importance to public health. However, presently there is little or no information on the public health aspects of pigs at slaughter slabs in Zambia. The lymphatic system of the pig is practical for and of prime importance in meat inspection [3, 4] and lymph node examination is globally accepted as being an effective meat inspection procedure [5]. During pig meat inspection, mandibular lymph nodes and tracheobronchial lymph nodes should always be examined [3]. The purpose of this study is to investigate the

significance of both gross and microscopical lymph node inspection of mandibular and tracheobronchial lymph nodes found in pigs at the Chibolya slaughterslab.

II. MATERIALS AND METHODS

Location and time of the study

The Chibolya abattoir was visited in August 2012. Chibolya is located on the northwestern side of the Lusaka city center and adjacent to the Lusaka's biggest market, the New City Market (widely known as "Soweto" Market). The slaughterslab opens everyday and the average number of pigs brought per day is approximately 40 (personal communication). There is a livestock market (Chibolya small livestock association market) close to the slaughterslab. Pigs slaughtered at this abattoir were gathered by middlemen from small scale farmers all over Zambia. The Chibolya small livestock association market and slaughterslab operates as a service establishment under the management of the local authorities, but at the slaughterslab facilities, there is no antemortem examination of the pigs by a Veterinary Officer before slaughter and no postmortem examination by meat inspectors.

Animals

All 50 pigs examined were crosses of Large white and Landrace breeds covering both sexes. They were from the Southern and the Western province of Zambia.

Stunning and dressing carcasses

At Chibolya slaughterslab, "stabbing and piercing" was observed as the sole method employed for killing pigs. The carcass was burned with grass and shaved on the ground individually, and then brought to the slab. On the slab, the carcass was incised on the midline cranially to the chin and caudally to perineum, just above the genitalia. The spleen, stomach, and intestines and then genitalia were discarded. The carcasses with upper alimentary tract, lungs, heart, liver, and kidneys intact were put on a wheelbarrow and brought to a small building

surrounded by a wall of concrete blocks where at most six carcasses can be butchered. Each pig carcass was hoisted by the lower jaw. The carcass was cut into four joints (head, two shoulders, and others (berry, loin, filet, two shanks, and two feet). Furthermore, the joint and viscera were cut into small pieces by electric saws, according to the customer's request.

Pathology

Mandibular lymph nodes (Lymphocentrum mandibulare) and tracheobronchial lymph nodes (Lymphocentrum bronchale) from the 50 hoisted pig carcasses were examined grossly and full cross sections were made of the nodes. Tissue samples were fixed into 10% neutral buffered formalin, embedded in paraffin, and sectioned. All sections were stained with hematoxylin and eosin (HE). The pathological lesions of both lymph nodes were simply classified into four categories as described by Wilson: 1. granulomatous lymphadenitis (eg. acid-fast bacteria (tuberculous and nontuberculous mycobacteria) infections and Rhodococcus equi (former Corynebacterium equi) infection), 2. lymphadenitis (e.g. simple (non-suppurative) lymphadenitis), 3. abscess, and 4. Lymphoma [4].

III. RESULTS AND DISCUSSION

A total of 50 pigs were examined during the survey. Lymph node changes were examined both at the slaughterslab grossly and in the laboratory by the routine histological procedure. In 50 mandibular lymph nodes, 4 granulomatous lymphadenitis, 39 lymphadenitis, and 1 abscess were noted. In 50 tracheobronchial lymph nodes, 2 granulomatous lymphadenitis and 31 lymphadenitis were noted. The gross pathological changes of the lymph nodes mostly reflected on the histopathological changes and the histopathology facilitated correct diagnoses. Microscopic examination was necessary to differentiate lymphadenitis from other causes of macroscopical nodal enlargement. According to the annual report 2011, the total number of carcasses condemned was 6 out of 15,190 pigs in Zambia. The most frequent encounters of porcine pathological lesions are in the lungs and this has been a constant feature [1]. Although, at

least in one modern abattoir in Lusaka, as the lungs are usually not edible, all lungs were condemned without inspection (personal communication). Most inspection strategies have emphasized using lymph nodes as indicator systems for the nature and extent of disease processes in the body [4]. The drainage area of the mandibular lymph nodes includes the head and for tracheobronchial lymph nodes includes the lungs [3]. During pig meat inspection, mandibular lymph nodes and tracheobronchial lymph nodes should always be examined [3]. However, no pathological changes have been noted in pig lymph nodes in Zambian abattoirs. At slaughterlabs, it is difficult to perform the detailed recommended post-mortem examination for pigs in developing countries [6, 7]. As for lymph nodes, inspection and incision of the submaxillary, bronchial, mediastinal, portal and mesenteric, iliac, superficial inguinal, and mammary lymph node are recommended [6]. Considering that the lymph nodes are not edible, the ease of obtaining permission to take samples and the methods used to stun and dress pigs at slaughterlabs in Zambia, it is practical to inspect at least the mandibular and tracheobronchial lymph nodes at such sites.

The present results highlight the need for introducing both gross and microscopical lymph node inspection practices at the slaughterlabs and for the improving awareness of butchers and swine traders in regards to the importance of these inspections.

IV. CONCLUSION

Although pork flesh is not a staple constituent of the human diet, it provides an important source of digestible protein, and pork meat consumption is increasing annually in Zambia, correlating with the improving the standard of living. It is evident that meat inspection plays a major role in safeguarding human health. Although the ultimate goal is to perform recommended post-mortem examination in developing countries as routine porcine meat inspection, slaughterlabs in Zambia still have a long way to go to achieve this. Lymph node inspection of the pig is of practical use and in common with other meat processing

facilities of prime importance in meat inspection at slaughterlabs.

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REFERENCES

1. Annual report 2011. Lusaka City Council Public Health Department.
2. Manual for the slaughter of small ruminants in developing countries, <http://www.fao.org/DOCREP/003/X6552E/X6552E00.HTM>
3. Nickel, R., Schummer, A. & Seiferle, E. (1981). Lymph nodes and lymph collecting ducts of the pig, In Schummer, A., Wilkens, H., Vollmerhaus, B. & Habermehl, K-H. (Translation by Siller, W. G. & Wight, P. A. L.), *The Anatomy of the Domestic Animals Volume 3, The Circulatory System, the Skin, and the Cutaneous Organs of the Domestic Mammals*, (pp 364-383). Berlin: Verlag Paul Parey.
4. Wilson, A. (1980). *Practical Meat Inspection (Third Edition)*, (pp154, 166-167). Oxford: Blackwell Scientific Publication.
5. Ladds, P. W. (1986). *A color atlas of lymph node pathology in cattle*. Ames: Iowa state university press.
6. Mitchell, J. R. (1980). *Guide to Meat Inspection in the Tropics (Second Edition)*, J. R. Commonwealth Agricultural Bureaux, Oxford: Alden Press Ltd.
7. Herenda, D., Chambers, P. G., Ettriqui, A., Seneviratna, P. & da Silva, T. J. P. (1994). *Manual on meat inspection for developing countries*. Rome: FAO.