P-ISSN: 2304-3075; E-ISSN: 2305-4360
International Journal of Veterinary Science
www.ijvets.com; editor@ijvets.com
Short Communication https://doi.org/10.47278/journal.ijvs/2021.117

Prevalence of Lung Lesions in Imported Cattle Slaughtered at Abu Simble Abattoir, Egypt

Amer Mohamed Abdel-Ati Abdel -Rassol[1], Ali Meawad Ahmed[2], Hassan Mohamed Sobhy[3], Sherein S. Abdelgayed[4,*] and Sahar Hussein Abdalla Hekal[3]

[1]GOVS/Abu Simbel Veterinary Quarantine: [2]Department of Food Hygiene, Faculty of Veterinary Medicine, Suez Canal University, Egypt; [3]Department of natural resources, Faculty of African Postgraduate Studies - Cairo University, Egypt
[4]Department of Pathology, Faculty of Veterinary Medicine, Cairo University, Giza, Egypt
***Corresponding author:** sherein.abdelgayed@vet.cu.edu.eg

Article History: 21-441 Received: 11-Nov-21 Revised: 02-Dec-21 Accepted: 15-Dec-21

ABSTRACT

A retrospective study of imported cattle slaughtered at Abu Simble Abattoir, Aswan, Egypt was conducted to determine the main causes of lung condemnation. The economic importance was estimated. During the study, a total number of 81452 slaughtered and investigated male cattle for a period of one full year (December 2018 to December 2019). All the condemned organs were lungs (n=9172; 11.26%) and had pathological lesions. The principal cause of lungs condemnation was pneumonia (47.4%), followed by congestion (28.2%), adhesions (22.1%) and abscesses (2.4%). Lungs histopathological examination recorded different inflammatory reactions with different types of pneumonia, bronchopneumonia, interstitial pneumonia, broncho-interstitial pneumonia, fibrinous pneumonia, hemorrhagic pneumonia, and suppurative pneumonia. The present work concluded that a serious problem may develop due to lung diseases/lesions which have negative effect to the livestock industry, in addition to the public health importance of zoonotic diseases.

Key words: Cattle, Lung lesions, Meat inspection, Economic losses.

INTRODUCTION

The African poor communities depend on livestock trade which plays essential role in the national economy of these communities (Basagoudanavar and Hosamani 2013). Egypt has a great animal population in Africa with approximately 9.5 million heads and 484 abattoirs as reported by the Ministry of Agriculture and Land Reclamation in 2019. Slaughterhouses played a crucial role in distinguishing the meat with different affections and thus preventing their marketing to consumers (Alton et al. 2010). Meat is the most delicious food which considered one of favored food due to its great nutritional value, where the beef plays important role in meeting the needs of annually increasing animal protein for the Egyptians. Where most of these cattle are imported from Africa (Hekal et al. 2019). On the other hand these delicious meals may act as source of disease distribution among animals as well as human beings (Ahmad and Elsharawy 2018), subsequently the meat inspection plays an important role in screening out and providing information that help in detection and controlling of animal diseases in developing African countries (Hussen et al. 2017). With concern in lung condemnation, the data obtained during postmortem examination play critical role in control of zoonotic diseases (Jaja et al. 2016). This significantly emphasizes the value of the abattoir records in tracking the diseases prevalence and control and to surety of public health (Mellau et al. 2010) With concern to importance of meat inspection records in control of animal diseases. So, the present work was concentrated on detection of lung lesions in slaughterhouse to assess the frequency of pathological lesions of lung with respect to their negative effect on economic. The findings of this study might contribute to establishing a suitable policy for the banning and monitoring of animal diseases in Egypt particularly in southern Egypt.

MATERIALS AND METHODS

Ethical statement not required as all samples were taken from slaughtered animals. The study was done at Abu Simbel abattoirs in Abu Simbel city, Aswan Governorate, Egypt. A total of 81452 male cattle with different body

Cite This Article as: Abdel-Rassol AMA-A, Ahmed AM, Sobhy HM, Abdelgayed SS and Hekal SHA, 2022. Prevalence of lung lesions in imported cattle slaughtered at Abu Simble Abattoir, Egypt. International Journal of Veterinary Science 11(3): 396-399. https://doi.org/10.47278/journal.ijvs/2021.117

condition and age were slaughtered and inspected in different localities in Abu Simbel abattoirs started from December 2018 till December 2019, seasonally based (winter, spring, summer and autumn).

A total number of 81452 slaughtered male cattle (carcasses and organs) were post- mortem inspected, lungs with visible lesion(s) were weighted and imaged. Then specimens 5–10mm thick were selected to include the area containing lesions and fixed in neutral buffer formalin for histopathological examination.

Fixation with 10% neutral buffered formalin were done for different samples of lung lesions, after that the samples were undergo washing, dehydration, clearing and finely embedded in paraffin. Preparation of samples were according to Bancroft and Stevens (1996). The blocks of tissue embedded in paraffin were sectioned at 4-5µm thickness. For staining the hematoxylin and eosin stain were used, finely the histological changes were examined by digital microscope (Olympus BX50, Japan) with recording of histological findings.

RESULTS AND DISCUSSION

In view of the reality that the biggest laboratory on the earth is the abattoirs; there are many purposes of meat inspection from which is the removal of meat and animal product which unsafe for human consumption (Madzingira et al. 2018). In addition to the important role in diseases mentoring and control (Vial and Reist 2014). The present work was undertaken for a full year. Where 81452 male cattle were used in this study. There was 0.463% either totally or partially condemned. Meat was obtained from a total of 16013463.2kg weight cattle were slaughtered at Abu Simbel abattoirs. The percent of condemned carcasses and edible organs from male cattle were 0.487% in winter, 0.485% in spring, 0.468% in summer and 0.367% in autumn as showed in Table 1 and Fig. 1.

From 81452 slaughtered male cattle, a total of 23261condemned edible organs and carcasses were detected, where the highest percent of macroscopic pathological lesions were as follows; 11.26% lungs followed by 9.27% livers, 4.95% heads, 1.87% hearts, 0.04% kidneys, 0.59% total and partial carcasses condemnation, 0.48% intestines and the lowest condemnation rate was in the rumens 0.09% as showed in Table 2 and Fig. 2. From the above result we found that the condemned lungs represent 11.26% of all condemned organs. This can be explained by knowing the nature of the anatomical and histological structure of the lungs, which makes it one of the most vulnerable organs to physical, chemical and biological injuries, and this is supported by the findings of Mohammed and Maky (2020) and Rassol et al. (2020).

The principal causes of lungs condemnation (9172 lungs) were pneumonia (47.4%), congestion (28.2%), adhesions (22.1%), and abscess (2.4%) as showed in Table 3 and Fig. 3, these results were in agreement with (Ahmed et al. 2013) where the major cause for lung condemnation in Ismailia abattoir, Egypt is Pneumonia. Also, (Teshale et al. 2017) concluded that the pneumonia is the most detected pulmonary lesions in cattle slaughtered at Gondar Elfora abattoir.

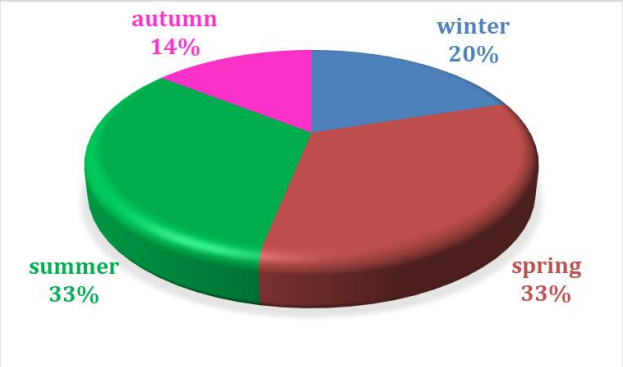

Fig. 1: Frequency percentage of cattle slaughtered in Abu-Simbel Abattoir during four seasons.

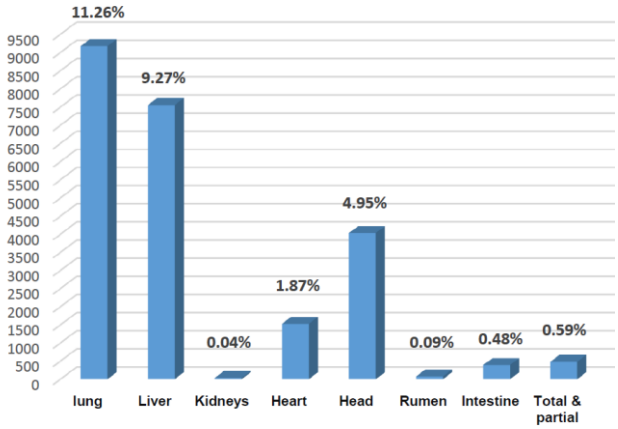

Fig. 2: Frequency distribution of numbers of different types of condemnation and along four seasons (1 year).

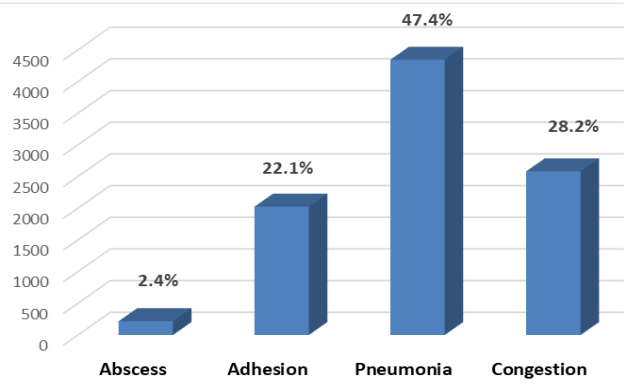

Fig. 3: Frequency of pathological conditions causes condemnation and losses of lung.

Postmortem lungs lesions showed pneumonia with grayish coloration and hepatized consistency especially in both cranial and the anterior part of the diaphragmatic lobes that showed also large abscesses containing yellowish pus, Cyanosis and congestion with bluish discoloration in lung was also grossly observed in Abu Simbel abattoirs (Fig. 4). Zeryehun and Alemu (2017) noticed that congestion is the most common postmortem lesion. Many factors may contribute to lung diseases; for example, the pulmonary vessels obstruction can lead to pulmonary congestion due to inflow of blood in the lung, on the other hand lungs with congestion and hemorrhages may developed as result of method of slaughtering and delaying hoisting after slaughter. Moreover, many stress factors may be act as

Table 1: Total numbers and weights of slaughtered cattle during a full year and total weight and percentage of condemnation

Season	Total No. of slaughtered	Avg. individual weight	Total weight of slaughtered	Total weight of condemnations	
				kg	%
Winter	16294	196.6	3203400.4	15616.08	0.487
Spring	26968		5301908.8	25723.14	0.485
Summer	26556		5220909.6	24413.15	0.468
Autumn	11634		2287244.4	8389.28	0.367
Total	81452		16013463.2	74141.65	0.463

Table 2: Frequency of economic and weight losses during the different four seasons

Types of cond.	Losses (kg)	Losses ($)
Total & partial condemnations of carcasses	33945	169725
Liver	5208.98	26044.9
Lung	3915.43	19577.15
Head	13825.12	69125.6
Heart	1410.32	7051.60
Intestine	1368.6	6843
Rumen	518.2	2591
Kidneys	13.95	69.75
Total	60205.6	301028

Table 3: frequency of pathological conditions causes condemnation and losses of lung

Cause	Number of cases	Diseases (%)	Losses kgs	Losses (%)
Abscess	218	2.4	108.1	0.001
Adhesion	2026	22.1	851.6	0.005
Congestion	2583	28.2	1192.9	0.007
Pneumonia	4345	47.4	1762.83	0.011

predisposing factors to respiratory conditions like insufficient space, pasture and water (Radostits et al. 2010).

Lung histopathological examinations recorded different inflammatory reactions with different types of pneumonia; Bronchopneumonia, Interstitial pneumonia, Broncho-interstitial pneumonia, fibrinous pneumonia, hemorrhagic pneumonia, and suppurative pneumonia, these findings are in agreement with the findings of Belkhiri et al. (2009) who reported many types of pneumonia in Tiaret and Batna slaughterhouses as cause of lung condemnation; the interstitial pneumonia and the hemorrhagic pneumonia. Also, Abscess was recorded in many. Interstitial pneumonia were reported and showed inflammatory reaction in the interstitial tissue denoted by congestion in the interstitial blood vessels and mononuclear cells infiltration resulting in thickening in the alveolar wall and narrowing in the alveolar lumen (Fig. 5a). Bronchopneumonia, it revealed bronchial hyperplasia, accumulation of luminal exudates mixed with leucocytic cells. Bronchitis and peribronchitis were also denoted and represented by marked inflammatory reaction including both; bronchial wall and peribronchial area**.** Broncho-interstitial pneumonia was also reported and denoted by marked inflammatory reaction including both bronchi (bronchopneumonia) and interstitial tissue (interstitial pneumonia) (Fig. 5b). Fibrinous pneumonia was also recorded and revealed pink network of fibrin infiltration in the alveoli together with the congested blood vessel and mononuclear cells infiltrations (Fig. 5c). Hemorrhagic pneumonia showed accumulation of red blood cells inside the alveoli which massively obstructed with compensatory emphysematous dilatation of other alveoli and formation of giant alveoli (Fig. 5d). Suppurative pneumonia was also recorded and revealed focal structure less area of suppuration which surrounded by living neutrophils.

Fig. 4: Postmortem lesions of lungs showing pneumonia (Left) and abscess formation (Right).

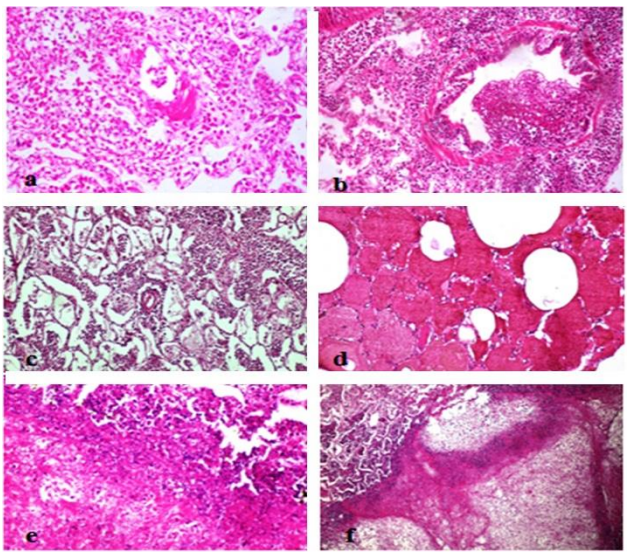

Fig. 5: Photomicrographs of lungs showing: **a:** Interstitial pneumonia; note the inflammatory reaction in the interstitial tissue together with thickening in the alveolar wall, (H&E X 400): **b:** Broncho-interstitial pneumonia; note the marked inflammatory reaction including both bronchi and interstitial tissue, (H&E X200): **c:** Fibrinous pneumonia; note the fibrin infiltration in the alveoli together with the congested blood vessel and mononuclear cells infiltrations, (H&E X 200): **d:** Hemorrhagic pneumonia; note the accumulation of red blood cells inside the alveoli which massively obstructed with emphysematous dilatation of other alveoli and formation of giant alveoli, (H&E X 200): **e:** Suppurative pneumonia; note the focal area of suppuration which surrounded by neutrophils, alveoli filled with neutrophils as well, (H&E X 400): **f:** Chronic abscess; note the formation of pyogenic membrane that enclose and separate the area of suppuration from the healthy one, (H&E X 200).

Alveoli were also massively infiltrated with neutrophils, (Fig. 5e). Abscess was also recorded and histologically characterized by formation of pyogenic membrane that enclosed and separated the area of suppuration from the healthy one **(**Fig. 5f). Similar lesions were detected by (Hamed et al. 2018), who detect lesions of fibrinous Pleuropneumonia in 36 lung samples of 1450 slaughtered

animals. The lungs usually show most pathological lesions in slaughtered animals as a result of many factors including the fine structure and direct connection with the external environment (Mohammed et al. 2020).

Conclusion

The present work conclude that a serious problem may be developed due to lung diseases and lesions which have negative effect and drawback to livestock industry, in addition to the public health important of zoonotic diseases that may be transmitted to human, which clearly demonstrates the importance of meat inspection in monitoring and control of animal diseases and ensure that appropriate standards are followed in slaughtering operations. Another important point is early detection of problems that may negatively affect public health as well as animal health and welfare.

Acknowledgement

The authors are thankful to General Organization for Veterinary Services, Egypt.

Author's Contribution

AMA R and S HA H carried out the filed study and laboratory work, SSA carried out the histopathological examination. AMA and H MS prepare this manuscript.

REFERENCES

Ahmad AM and Elsharawy NT, 2018. Condemened meat and offal from different slaughtered animals at two different environments. Journal of Food : Microbiology, Safety & Hygiene 3: 133. https://doi.org/10.4172/2476-2059.1000133

Ahmed AM, Ismail SAS and Dessouki AA, 2013. Pathological lesions survey and economic loss for male cattle slaughtered at Ismailia abattoir. International Food Research Journal 20: 857–863.

Alton GD, Pearl DL, Bateman KG, McNab WB and Berke O, 2010. Factors associated with whole condemnation rates in provincially inspected abattoir in Ontario 2001-2007: Implication for food animal syndromic surveillance. BMC Veterinary Research 6: 42. https://doi.org/10.1186/1746-6148-6-42

Basagoudanavar SH and Hosamani M, 2013. 'Trans-boundary Diseases of Animals : Mounting Concerns', VETSCAN7: 1–5.

Bancroft JD and Stevens A, 1996. Theory and practice of histological techniques. Edinburgh: Churchill Livingstone; pp: 766.

Belkhiri M, Tlidjane M, Benhathat Y and Meziane T, 2009. Histopathological study and pulmonary classification of bovine lesions. African Journal of Agricultural Research 4: 584–591.

Hamed MG, Ali FAZ, Mahmoud AZ and Abd-ELghaffar SK, 2018. PAthological lesions and incidence of fibrinous pleuropneumonia in imported beef cattle slaughtered at abu-pathological lesions and incidence of fibrinous pleuropneumonia in imported beef cattle slaughtered at Abu-Simbel city – Aswan. Assiut Veterinary Medical Journal 64: 33–38.

Hekal SHA, Al-Gaabary MH, El-Sayed MM, Sobhy HM and Fayed AAA, 2019. Seroprevalence of some Infectious transboundry diseases in cattle imported from Sudan to Egypt. Journal of Advanced Veterinary and Animal Research 6: 92–99. https://doi.org/10.5455/javar.2019.f318

Hussen M, Hussen S, Chali G and Abdurahaman M, 2017. Parasitic cause of organ and carcass condemnation in small ruminant slaughtered at Helmex Abattoir, Debrezeit, Ethiopia. International Journal of Research Studies in Biosciences 5: 22–30.

Jaja IF, Mushonga B, Green E and Muchenje V, 2016. Prevalence of lung lesions in slaughtered cattle in the Eastern Cape Province, South Africa. Journal of South African Veterinary Association 87: 1–9.

Madzingira O, Chinyoka S, Yule J, Mwenda E, Kandiwa E, Samkange A and Mushonga B, 2018. A Retrospective Study of Carcass and Organ Condemnations at a Beef Abattoir in Namibia. Alexandria Journal of Veterinary Sciences 59: 34. https://doi.org/10.5455/ajvs.277323

Mellau LSB, Nonga HE and Karimuribo ED, 2010. A slaughterhouse survey of lung lesions in slaughtered stocks at Arusha, Tanzania. Preventive Veterinary Medicine 97: 77–82. https://doi.org/10.1016/j.prevetmed.2010.08.008

Mohammed ES and Maky MA, 2020. Meat Condemnations and economic importance in the northern and southern Egyptian Abattoirs. Advances in Animal and Veterinary Sciences 8: 96–107. https://doi.org/10.1016/0300-9084(88)90104-6

Radostits OM, Gay CC, Hinchcliff K and Constable PD, 2010 . A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs and Goats, 10th Ed; Elsevier Science Health Science Division pp: 541.

Rassol AMA, Ahmed AM, Sobhy HM, Abdelgayed SS and Hekal SHA 2020. Effects of fascioliasis on the economic losses of beef liver at Abu Simbel Abattoir, Aswan Governorate, Egypt. Advances in Animal and Veterinary Sciences 8: 1175–1179. https://doi.org/10.17582/journal.aavs/2020/8.11.1175.1179

Teshale B, Mebrahtu G and Abebe T, 2017. Identification of pulmonary lesions in slaughtered cattle and associated risk factors, North West Ethiopia. African Journal of Agricultural Research 12: 1447–1450. https://doi.org/10.5897/ajar2017.12215

Vial F and Reist M, 2014. Evaluation of Swiss slaughterhouse data for integration in a syndromic surveillance system. BMC Veterinary Research 10: 1-12. https://doi.org/10.1186/1746-6148-10-33.

Zeryehun T and Alemu B, 2017. Major gross lesions of lung in cattle slaughtered at Hawassa Municipal Abattoir, Southern Ethiopia. Journal of Veterinary Medicine 2017: Article ID 1702852. https://doi.org/10.1155/2017/1702852

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