Slaughterhouse Survey on the Frequency of Pathologies Found in Bovine Post-mortem Inspections

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Abstract:

The aim was to reveal the prevalence of post-mortem lesions in two large-scale bovine slaughterhouses found in Romania so as to point out the potential hazards for human health. The proper examination of animal carcasses and organs that are destined for human consumption is essential in order to ensure food safety but not all the time properly made due to lack of time during the process of slaughter. The results showed that the most frequent lesions found within the examined organs were caused by parasitic infestation (*Echinococcus granulosus*; *Dyctiocaulus viviparus*) and the highest prevalence was found in the lungs. The pathology of lesions found in bovine organs is very variable in the slaughterhouse, being able to report strange aspects such an ectopic liver in the lung parenchyma. Measures should be taken in the farms due to this high prevalence of parasites which causes both health problems as well as economical losses.

Keywords: carcass, consumption, health, pathologic, parasite

Introduction

Slaughterhouses are a major source of concern for veterinary controls given the high frequency of disease detected which are important both for the economy and public health departments (Raji *et al*., 2010). Frequent bovine pathological lesions in the lungs, heart, liver, spleen have been described in detail in various official veterinary controls as well as research studies (Maxwell, 2005; Ahmedullah *et al*., 2007; Mellau *et al*., 2010; Alawa *et al*., 2011). Although the importance of the matter is very high, in Romania the number of abattoir survey studies have not been published recently and the actual prevalence of macroscopic and microscopic abnormalities not known.

The thorough pathological examination of carcasses and organs is a useful tool in preventing the occurrence of zoonotic disease and also improving the quality of meat products by removing the ones that show abnormalities. Research studies conducted until now have focused on one or two organs which tipically show frequent pathologies and few have encompassed the entire organs of the body. Also, it has been proved that the frequency of these pathologies are linked to geographical areas and sometimes breeding systems ((El-Dakhly *et al*., 2007; Mwabonimana, 2008; Belkhiri *et al*., 2009; Raji *et al*., 2010; Alawa *et al*., 2011). The post-mortem inspection and degree of accuracy when conducting the inspection depends on various factors such as degree of veterinary supervision, level of training and critical appraisal of the person which carried the investigation (Okoli, 2001).

The studies in this matter are relevant to public health given that they estimate the extent to which the consumers are exposed to the potential hazard of transmissible diseases. As stated earlier, the economical impact is also high given that in many cases the spread of a zoonotic disease which

goes undetected in the slaughterhouse implies more money spent on correcting and reducing the consequences. The fact that there are diseases which frequently appear in slaughterhouses and the fact that the veterinary public health departments are aware but do not mediatize them has lead us to the need of carrying out this survey on pathological aspects of bovine carcasses and organs obtained in two large scale units in Romania.

Presently, there is little information on the economic and public health aspects of carcass condemnation in Romania. The present survey reports on the diseases prevalent in cattle slaughtered in Romania, north-west region, between November 2016 to September 2017 and their public health significance and the financial implication of condemned carcasses.

Materials and methods

The research was performed in two large scale slaughterhouses found in Transylvania, the north west region of Romania, which mainly focus on bovine slaughtering. A total of 514 cattle (Bos indicus) were examined during this survey. The number of animals slaughter per day was around 150. These units normally have large scale farms that provide them with animals and very few bovines are also bought from traditional farming in areas nearby.

Ante- and post-mortem inspection

All the animals that were destined for slaughtering were visually inspected a day before and shortly prior to slaughter. The post mortem inspection implied the visual examination of organs and carcasses with keen attention on the main santinelle organs such as liver, heart, kidney, spleen, gastro-intestinal mass. Palpation and incision of organs were made whenever necessary and in order to evaluate the extent of the lessions.

Histopathological analysis

The analysis was carried out in the Anatomic Pathology department in the University of Agricultural Sciences and Veterinary Medicine, Cluj, Romania. The staining used was the classical Hematoxillin-Eosin method.

Statistical analysis

The results regarding the prevalence and possible difference between the two slaughter house units investigated were statistically analysed with the Origin 8.5 program, using the single factor categorical analysis system ANOVA.

Table 1. The frequency of disease/lesion according to organ/carcass

Organ	Disease or lesion	Frequency (%)	**Action taken**
Lungs	Echinococcosis	42%	Condemned
	Pneumonia	23%	Condemned
	Emphysema	14.2%	Condemned
	Tuberculosis	3%	Condemned
	Dyctiocaulosis	12%	Condemned
	Ectopic liver	0.19%	Partially condemned
Liver	Fasciolosis	35%	Condemned
	Cirrhosis	11 %	Condemned
	Echinococcosis	9%	Partially condemned
	Dicroceliosis	5%	Condemned
	Necrotic hepatitis	8%	Condemned
Heart	Pericarditis	6 %	Condemned
	Fat atrophy	11 %	Partially condemned
	Cysticercosis	0	Mandatory inspection
Kidneys	Nephritis	14%	Condemned
	Amyloidosis	5%	Condemned
Carcass	Fat atrophy, emaciation	9%	Condamned
	Tuberculosis	1.5%	Condamned

Results and discussions

The most common pathological finding with a localisation in the lungs was echinococossis (42%) (Figure 1). Also, another parasite frequently seen in the lungs of bovines slaughtered in this area was *Dictyocaulus viviparous* (Figure 2). The organ that was condemned most of the times because of various pathologies was the lung (Table 1). The liver was also an organ affected by parasites, such as *Fasciola hepatica* (Figure 4).

Of the 246 organs having lesions, 212 whole organs were totally condemned, while 12 carcasses were partially condemned. There were no differences between the two slaughterhouses investigated in the prevalence of the diseases or lesions mentioned ($p<0.05$). As seen also in table 1, in the heart the most common lesion found was the atrophy of the fat which normally is seen in case of an emaciated animal (Figure 3). The fat atrophy and emaciation was also noticed in some of the carcasses related to fat atrophy of the heart. In the carcasses that showed this emaciation sign we have also sectioned a long bone (humerus) to evaluate the bone marrow. This procedure is stipulated in the current European regulation (Reg. 854/2004) for establishing the cause of this emaciation. At the section of a long bone in all cases we noticed a softer consistency, grey colour and smaller quantity of the bone marrow, sometimes leaving holes inside the bone canal.

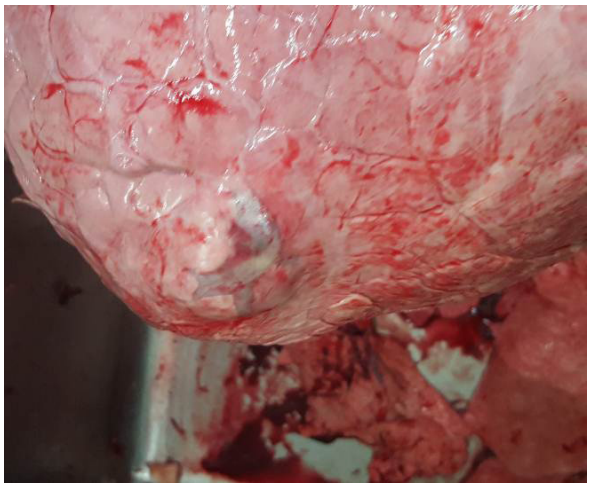

Figure 1. Echinococcus chist in the diaphragmatic lobe of the lung

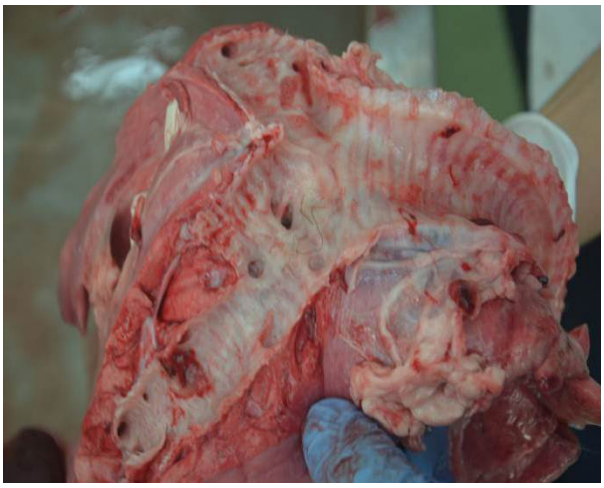

Figure 2. *Dictyocaulus viviparus* presence in the bronchia of the lung

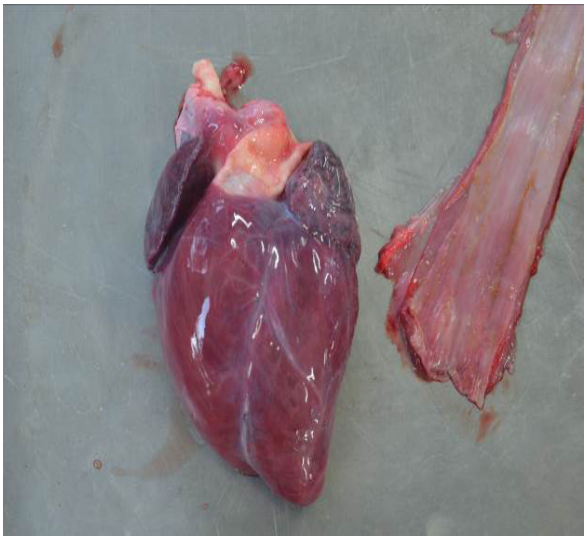

Figure 3. Fat atrophy of the heart

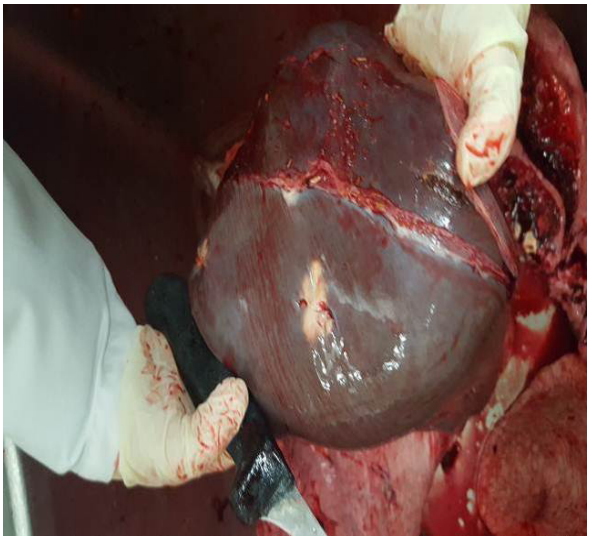

Figure 4. Modification in liver caused by parasite

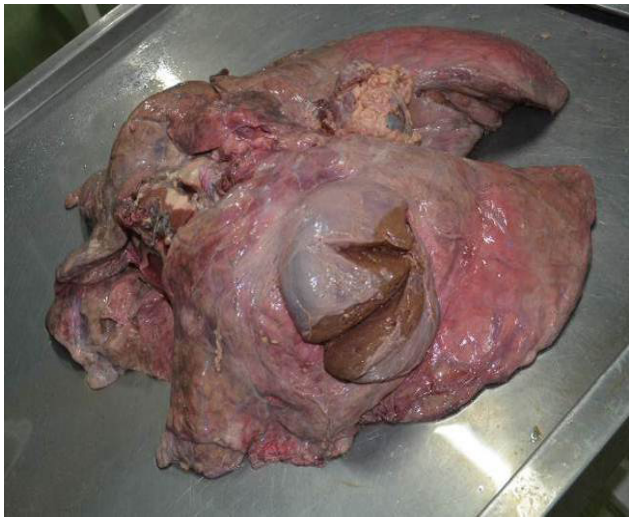

Figure 5. Ectopic liver in the lung

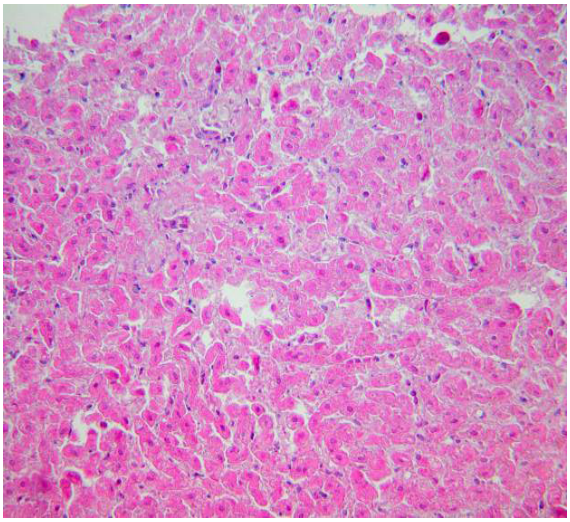

Figure 6. The histological aspect of the ectopic organ

Usually the slaughterhouse provides a good opportunity to find unusual pathologies and that us what we also found in this study. A rare case of liver ectopy was found in a bovine lung, modification that was never mentioned before in the current literature (Figure 5). The liver tissue was confirmed by histological analysis (Figure 6).

Our study has shown that among the most common lesions found in bovine organs were caused by parasite presence (Figure 1, Figure 2, Figure 3). This is in conformity with other studies that showed the economic importance of fascioliosis, echinococcosis, parasitic gastroenteritis, cysticercosis (Tembely *et al*., 1988; Okolo, 1985; Nfi and Alonge, 1987; Matovelo and Mwamengele, 1993; Okoli *et al*., 2000). In other countries cysticercosis was found in the muscle of the heart or at maseterine level but we have not identified a single positive case. This shows that in Romania the presence of this parasite in bovine is not very frequent. It is a very positive fact, given that its presence may cause prodigious losses in food animal industry through meat condemnation. The fact that we have revealed the presence of parasites in a high percent calls for improved control and preventive measures to be applied more thoroughly . It is recommended that a regular deworming is applied in breeding systems so as to reduce the number of positive cases.

Conclusion

The findings revealed in this study suggest that there is a need of preventive measures to be applied in breeding systems so as to reduce the number of condemned organs and carcasses. There is a great economical loss due to the presence of various pathologies which can be prevented sometimes only by applying efficient sanitary veterinary controls. A proper meat inspection and a better livestock management system is required in order to reduce the losses obtained in the two slaughterhouses in Romania.

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