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Original article

Neoplastic lesions in slaughter animals in Warmińsko-Mazurskie voivodship (Poland) area during the years 2001-2007

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Abstract

During the period of 7 years, 2001-2007, 110,273 heads of cattle and 3,055,654 heads of pigs were examined by veterinarians of the Polish Veterinary Inspection in Warmińsko-Mazurskie voivodship. As a result of pre- and post-slaughter examination, 311 heads of cattle and 23 heads of pigs representing 0.279% and 0.00075% of the population respectively were considered unsuitable due to neoplastic lesions. The most frequently found lesions in cattle were fibroneuromas, neuromas and liposarcomas while in case of pigs those were various types of sarcomas, fibromas, cancers, nephromas and melanomas.

Key words: neoplastic lesions, cattle, pigs, post-slaughter examinations

Introduction

Despite the continual progress of oncological sciences applying early diagnose and state of the art methods of therapy, neoplastic diseases represent a serious global health problem as in the industrialized countries they are the second after the circulation system diseases cause of deaths in the given population. Such diseases cause the death of 18-20% of the people (Zemla 1995, Wojciechowska et al. 2004).

In Poland, in 2004, the malignant neoplasms registers received information that the disease were diagnosed in over 136,000 people and 90,000 deaths caused by them were recorded, which shows the scale of the problem. Malignant neoplasms represent an increasing health and economic problem for the Polish

society (Zatorski 2007). Neoplasms have also become a serious public health problem in Europe.

The issue of neoplastic diseases in animals receives much less attention than in the human medicine. Nevertheless, immense steps forward were made in that field as concerns expansion of the knowledge of neoplastic disease development in animals. That development was forced by economic losses caused by neoplastic diseases in large-scale production, mainly of poultry and cattle.

The available literature indicates that neoplasms in slaughter animals are the cause of large economic losses and that they are not accepted by consumers as edible raw materials (Zhu et al. 1984, Leopold et al. 1989, Grundboeck 1993, Griglio et al. 1993, Bundza et al. 1996). The issue of the possible transfer of neo-

plasms from sick animals via food products to people has been neither confirmed nor absolutely excluded so far.

The American Academy of Sciences published a report called "Diet, nutrition and cancer", in which it is estimated that 40-60% of all human cancer cases are food related (Diet, nutrition and cancer, 1982). Similar opinions are also formulated in many other countries, including Poland.

The literature data tends to present the opinion that the etiology and pathology of neoplastic diseases in humans and animals are very similar. In slaughter animals, various neoplastic diseases are found, the most frequently in cattle and hens (Czerniak 1983, Koncicki and Krasnodębska-Depta 1997). Although neoplasms are conditioned genetically, their appearance is influenced by numerous oncogenic factors, largely caused by the external environment. The available literature indicates that 80-90% of cases of neoplastic diseases are caused by the environmental conditions (Doll and Peto 1981), i.e. the lifestyle, and in particular nutrition, social and cultural behavior and pollution of the environment, food, water and air (Skommer 2002).

There is a common belief concerning the direct correlation between occurrence of neoplastic diseases and degradation of the natural environment caused by human activities. According to different researchers, the share of environmental factors dependent on air pollution in the etiology of neoplasms may reach from 8% to 13%, and 20% in countries with particularly polluted environment (Koszarawski 1992, Roik 1994). That was found on numerous occasions during the studies conducted on immigrants in different countries. If in Japan a relatively large percentage of the population suffers from gastric carcinoma and in Hawaii the colonic carcinoma is frequent, in the second, or even the first generation of the Japanese who resettled to Hawaii the gastric carcinoma is rarely found while the colonic carcinoma is more frequent (Doll et al. 1994, Parkin et al. 2002).

Appearance of neoplastic diseases in animals in a given area can be a warning signal for people indicating the natural environment degradation as it provides much important information on, among others, intensification in appearance of a certain neoplastic process in a given animal population. Post-slaughter examinations provide an important source of information on the frequency of neoplasms. Papers concerning neoplasms in slaughter animals, however, are few.

The aim of the study was to conduct the detailed analysis of frequency of neoplasms in cattle and pigs in the area of Warmińsko-Mazurskie voivodship (Poland) and a comparison of the results obtained with the results of equivalent studies conducted in the same area during the past years based on the data in

the logs of the Official Examination of Slaughter Animals and Meat.

Materials and Methods

The material for the study consisted of the results of the official post-slaughter examinations of cattle and pigs conducted by veterinarians of the Polish Veterinary Inspection during the years 2001-2007 at meat processing plants, abattoirs and slaughterhouses within the area of Warmińsko-Mazurskie voivodship (Poland). Detection of neoplasms was based on typical anatomopathological lesions confirmed by laboratory tests. Cases of leukemia were disregarded in the analysis.

Results

The results obtained are presented in Figs. 1-3. As indicated in these graphs, 111,273 heads of cattle and 3,055,654 heads of pigs were examined in the area of Warmińsko-Mazurskie voivodship during 7 years, i.e. 2001-2007 (Fig. 1). As a result of the pre- and post-slaughter examinations, 311 heads of cattle and 23 pigs representing 0.279% and 0.00075% respectively, were considered unsuitable.

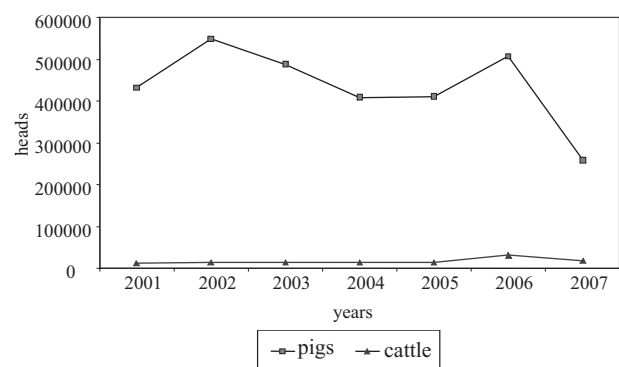


Fig. 1. Heads of animals slaughtered in Warmińsko-Mazurskie voivodship (Poland).

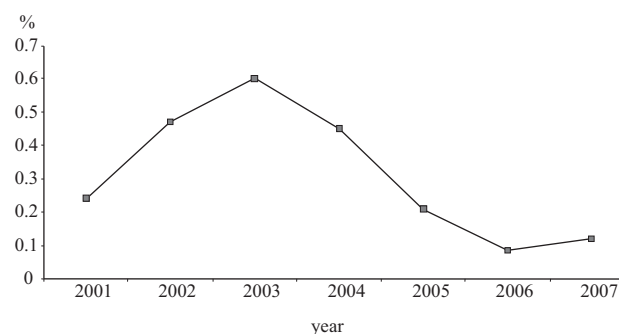


Fig. 2. Occurrence of neoplastic lesions in cattle in Warmińsko-Mazurskie voivodship (Poland).

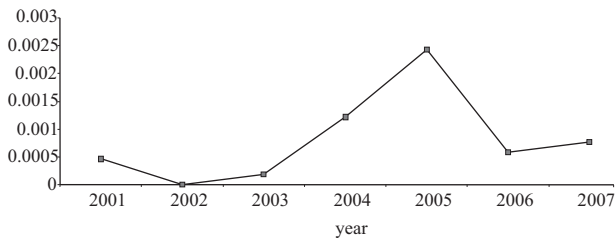


Fig. 3. Occurrence of neoplastic lesions in pigs in Warmińsko-Mazurskie voivodship (Poland).

Fig. 2 shows that the frequency of neoplasms in cattle was from 0.60% in 2003 to 0.085% in 2006. The lesions were situated mainly in the lymphatic nodes, intercostal muscles, liver, kidneys, spleen and heart. The most frequently found neoplasms were fibrosarcomas, neuromas and liposarcomas. The lymphatic nodes and internal organs showing neoplastic lesions were enlarged and in cross section fat-like with foci of softening, hyperemia and necrosis. Carcasses with neoplastic changes showed watery meat tissue and jelly-like texture of the fatty tissue. Neoplastic lesions were found in cows aged from 5 to 10 years.

Fig. 3 shows that the frequency of neoplasms in pigs was not high at 0.00243% in 2005 to no cases detected in 2002. The incidence and mortality caused by neoplasms are strongly correlated with the age representing the duration of exposure to the carcinogenic factors. The neoplastic lesions found were located in muscles, liver and lymphatic nodes. The neoplasms most frequently found in pigs were various types of sarcomas, fibromas, cancers, nephromas and melanomas.

Discussion

The studies by Czerniak (1983) indicate that during the years 1975-1981 in the area of Northern Poland, neoplastic tumors were registered in 0.3% of the examined bovine carcasses in average. In 1987, 3 million heads of cattle were slaughtered in Poland and neoplasms were found in 2,689 tested bovine carcasses, i.e. 0.08% (Lis 1989). During five years of 1989-1993 in Kieleckie voivodship, 269,222 heads of cattle were subject to post-slaughter examination and neoplasms were found in 0.03% of them (Konopka 1995). During the years 1991-1996, in Ciechanowskie voivodship, 110,320 bovine carcasses were subject to post-slaughter examination and neoplasms were found in 26, representing 0.02% (Gotz and Uradziński 1997). For comparison, in Olsztynskie voivodship during 7 years of 1990-1996, 438,485 heads of cattle were examined, in Płockie voivodship during 6 years of 1991-1996, 15,222,549 heads of cattle were examined and in Bydgoskie voivodship during 11 years of 1986-1996, 755,845 heads of cattle were examined. As a result of pre-and

post-slaughter examination, 1,077 heads of cattle representing 0.22% were declared unsuitable in Olsztyn voivodship, 52 heads representing 0.033% in Płockie voivodship and 393 heads of cattle representing 0.05% in Bydgoskie voivodship (Radkowski and Jopek 2000). In 2003, almost 1.1 million heads of cattle were slaughtered under veterinary supervision in Poland and neoplasms were found in 114 carcasses examined representing 0.001% of the total (Lis 2005).

Monlux et al. (1956) in Denver, Colorado, found 908 neoplastic tumors per 1.5 million heads of cattle. Misdorp (1967) in The Netherlands found 60 neoplastic tumors per 100,000 heads of cattle. Dukes et al. (1982) in Canada, found 1,370 cases of neoplasm per 17 million heads of cattle. Anderson et al. (1969) in the United Kingdom, found 302 neoplastic tumors in 100 abattoirs per 1.3 million of animals slaughtered. Ozkul and Aydin (1996) published the data concerning slaughter cattle from 14 Turkish provinces by the Black Sea. Among 5,567 cattle carcasses examined histological neoplastic lesions in the urinary bladder were confirmed in 815 carcasses. Garcia-Iglesias et al. (1991) found that the frequency of occurrence of neoplastic lesions increased clearly in older females aged more than 11 years and that they were located mainly in the uterus and ovaries.

In 1987, 15,919,727 pigs were slaughtered in Poland and neoplasms were found in 350 examined animals representing 0.002% (Lis 1989). During five years of 1989-1993, in Kieleckie voivodship 1,321,076 pigs were subject to post-slaughter examination and no neoplasms were found (Konopka 1995). During the period of 20 years, i.e. from 1976 until 1996, in Ostrołęckie voivodship 6,332,092 pigs were slaughtered and subjected to official veterinary examination and neoplasms were found in 121 of them representing 0.0019% (Listwoń and Sztejn 1997). For comparison, in Olsztyn voivodship, during 7 years i.e. from 1990 until 1996 3,674,271 pigs were examined, in Płockie voivodship during 1991-1996 years, 2,140,804 pigs were examined and in Bydgoskie voivodship during 11 years of 1986-1996, 9,407,474 pigs were examined. As a result of pre- and post-slaughter examinations 63 pigs representing 0.0017% in Olsztynskie voivodship, 11 pigs representing 0.0005% in Płockie voivodship and 134 pigs representing 0.004% in Bydgoskie voivodship were considered unsuitable (Radkowski and Jopek 2000). In 2003, 21,356,433 pigs were slaughtered under veterinary supervision in Poland and neoplasms were found in 41 examined carcasses, i.e. 0.0001% (Lis 2005). In Italy, in Turin province, out of 170,000 pigs slaughtered in 1991 nephromas were found in 15 animals (Guarda 1995).

Monlux et al. (1956) in Denver, Colorado, found 28 neoplastic tumors per 1,000,000 pigs. Misdorp (1967) in The Netherlands found 4 neoplastic tumors per 100,000 pigs. Anderson et al. (1969) in the United

Kingdom found 133 neoplastic tumors in 100 abattoirs per 3.7 million pigs. In Japan, the Veterinary Inspection found neoplastic lesions in 670 pigs out of 9,156,633 examined carcasses, which represented 0.007% (Kashima et al. 1995). The most frequently found neoplasm were: lymphomas with 146 cases, hepatocellular adenomas – 124 cases, nephromas – 121 cases, melanomas – 109, anginomas of ovaries – 69, and uterine myomas – 33. Neoplasms in pigs are found less frequently than in other animal species probably as a consequence of the facts that slaughtered pigs are relatively young.

Only healthy animals showing no lesions of a disease should be slaughtered. Animals with derogations from the standard or slaughtered out of necessity represent a minor percentage. Generally, neoplasms may lead to animal wasting and such animals may be sent for slaughter out off necessity. The majority of lesions termed as neoplasms are identified during the post-slaughter examination. They are observed as macroscopic changes in tissues or organs that can be accompanied by swelling, hyperemia and lymphadenitis.

Analyzing the frequency of neoplastic lesions in Warmińsko-Mazurskie voivodship, no increase in the incidence of neoplastic diseases in slaughter animals was found. This study can provide only a generalized image of the accidence of individual forms of neoplasms in cattle and pigs within a specified area of Poland but they represent valuable information on the health status of the cattle and pigs as concerns the development of neoplastic tumors.

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