Congenital jaundice in bovine aborted fetuses: an emerging syndrome in Southern Belgium

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Abstract

Southern Belgium faces an unusual recent increase of icteric bovine aborted fetuses. In the necropsy room, the majority of fetuses presented jaundice and splenomegaly. Despite a wide range of analyses, no definitive cause of abortion has yet been established but leptospirosis hypothesis. This first description of cases will help veterinary practitioners to recognize more cases and to conduct those to the laboratory for future investigations.

Keywords: Icteric abortion, Bovine, Emerging syndrome, Leptospirosis, Belgium

Southern Belgium (Wallonia region) faces an unusual situation with the drastic increase of congenital jaundice cases in bovine aborted fetuses. This unexpected event was notified on the 1st September 2014 by the Regional Association for Animal Registration and Health (ARSIA) to the competent authority, i.e. the Federal Agency for the Safety of the Food Chain (FASFC).

In Belgium, as in many other European countries, the reporting of bovine abortions and the subsequent analysis of their products for brucellosis is mandatory. An additional standardized panel of analyses, which is designed to screen a large number of pathogens associated with bovine abortion (see below) and routinely applied on fetuses submitted to the ARSIA laboratory, failed to identify the origin of these abortions.

During the last six years, cases of abortions with jaundice have been notified but the monthly incidence of these cases never exceeded 4% or more than 3 absolute cases per month. Since July 2014, more than 90 new cases of bovine aborted fetuses with jaundice have been reported by ARSIA pathologists, with a maximum monthly incidence of 9.37%. The incidence rate of icteric bovine aborted fetuses was significantly higher in September compared to the mean monthly incidence of the six previous years (Linear regression; p-value = 0.04). Concomitantly, an approximate 70% increase in the number of reported abortions was also observed compared to the previous year for the months of July, August and September. The peak of the weekly incidence was reached in the first week of October 2014 (15/98 abortions; 15.31%) (**Figure 1**). Then, the rate of fetuses with jaundice dropped to 4.36% three weeks after peaking whereas the number of reported abortions remained above the 2013 level for the same reporting period. In addition, abortions with jaundice were not

distributed homogeneously in the study area (Fisher's exact test, p-value = 0.03). There were significantly more cases in Hainaut (N = 29) and Namur (N = 17) provinces than in the three other provinces (N = 13) (Fisher's exact test, p-value = 0.002). From the affected farms, only one case of bovine aborted foetus was identified in 95% of the farms and two case in the remaining other 5%, which appears to be important information with regard to the epidemiology of the disease.

In the necropsy room, the majority of icteric bovine fetuses presented splenomegaly (**Figure 2**) and/or liver parenchyma uniformly coppered and/or perirenal hemorrhage and/or hemorrhagic edema; significantly there was an absence of inflammation within the lymph nodes. Fetal membranes appeared normal, transparent and thin. Histology demonstrated abnormalities in the liver where periportal lymphoplasmacytic infiltration and deposition of gold-brownish pigments in hepatocytes or in the bile canaliculi were observed. A small number (about 4%) of these abortions have breathed but they died within few hours after birth. All fetuses were submitted for brucellosis analysis and an additional standardized panel of analyses designed to extend the diagnosis of bovine abortions to other diseases than brucellosis, and involving methods for the direct and/or indirect detection of pathogens, such as bacteria (*Listeria monocytogenes, Salmonella Dublin, Coxiella burnetii, Anaplasma phagocytophilum, Bacillus licheniformis, Campylobacter* spp., *Leptospira borgpetersenii* and *interrogans* serovar *hardjo*), parasites (*Neospora caninum*) and viruses (bluetongue virus serotype 8 (BTV-8), bovine herpes virus 4 (BoHV-4), bovine viral diarrhea virus (BVDV) and *Schmallenberg* virus (SBV)), several mycotic agents, and numerous other opportunistic bacteria. Anamnestic information recorded by veterinary practitioner in a standardized form dedicated to the bovine abortion notification revealed that aborted animals did not show any particular clinical sign and did not receive medication during pregnancy. In addition, in comparison with control cases (non-icteric bovine aborted fetus submitted to the laboratory

during the same period), aborted cows did not have any contact with animals purchased or with environmental specific risks (e.g. wood, hedges, rivers and ponds). However, it was possible to demonstrate that more than 95% of these cases occurred during the last third of gestation and the Blue Belgian cattle was more likely to be affected by this syndrome.

Complementary laboratory diagnosis for bovine leptospirosis performed at the national reference laboratory with the microscopic agglutination test (diagnostic threshold dilution of 1/100) and covering a higher panel of serogroups indicated that 18/19 (95%) cows giving icteric abortions had antibodies against *Leptospira* serogroups Australis or Grippotyphosa. In this group, 13/18 (72%) of positive cows had titres > 1/500. Serological analyses in control cows (those giving non-icteric presentation of abortions at time period as the previous group) revealed antibodies against *Leptospira* serogroup Grippotyphosa in 6/22 (27%) with only 1/22 (4.5%) with titre >1/500, serogroup Autumnalis in 1/22 (4.5%) and titre >1/500, and serogroup Ballum in 2/22 (9%) with 0/22 with titre >1/500. The odds ratio to obtain a positive result for *Leptospira* serogroups in cows giving icteric presentation of abortions *versus* cows giving non-icteric presentation abortions was 48 (95% confidence interval [CI]: 5-442) and 55 (95% CI: 6-521) according to the diagnostic threshold dilution of 1/100 and 1/500, respectively.

The etiologies for congenital bovine fetal anomalies can be divided into heritable, toxic, nutritional, and infectious categories. Although antibodies against *Leptospira* serogroups Australis and Grippotyphosa were observed at high titers in cows delivering icteric abortions, further investigations are needed to confirm leptospirosis as the definitive diagnosis. Therefore, until now, the exact origin of this emergence remains unknown but other epidemiological investigations and diagnostic analyses are underway.

We hope that such description of field clinical observations made on this first serial icteric abortion cases will help the veterinary practitioners to recognize more suspected cases and to

conduct those to the laboratory for future investigations.

Figure 1. Trends of icteric bovine aborted fetuses rate and the absolute number of abortions notified

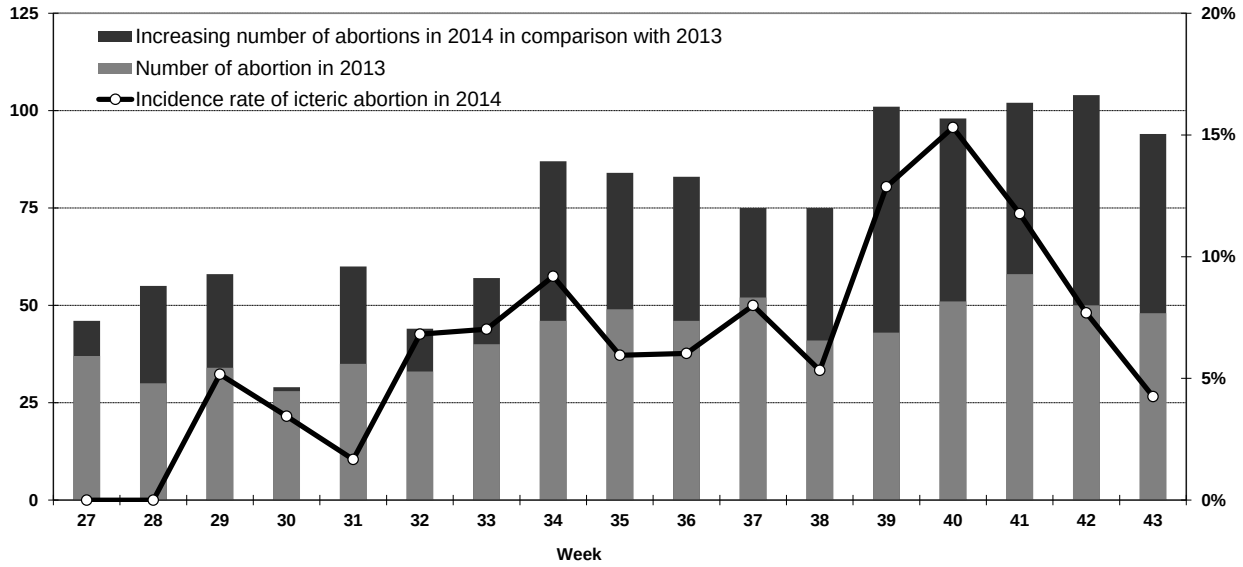
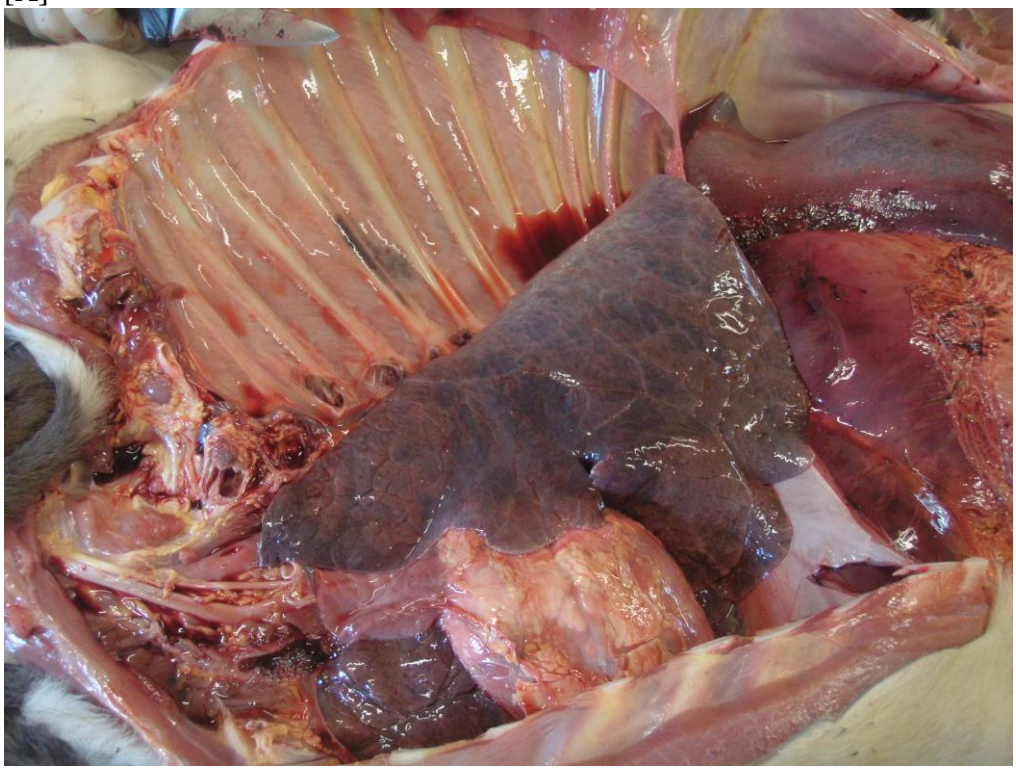


Figure 2. Bovine aborted fetuses of 9 month old with jaundice (pleura) and splenomegaly

Legend: [A] Icteric pleura; [B] Splenomegaly.

[A]



[B]