Role of Campylobacter jejuni as a placental pathogen

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Abstract
Members of the genus Campylobacter are well recognised as enteric pathogens but have rarely been implicated as human placental pathogens. A case of septic abortion due to C jejuni is reported. This occurred in a previously healthy woman with a diarrhoeal illness. The presence of chorioamnionitis raises the possibility of ascending infection rather than septicemia spread as the pathogenesis. Members of the genus Campylobacter have special culture requirements and their incidence as placental pathogens may therefore be underestimated.

Members of the genus Campylobacter have only comparatively recently been recognised as a cause of disease in humans. They are now considered to be one of the most common causes of infection worldwide, but they have not previously been regarded as placental pathogens. Campylobacter fetus (formerly vibrio fetus) has long been recognised in veterinary practice as a cause of septic abortion in animals, but the two main pathogenic species in humans, C jejuni and C coli, have not been seen in this context.

Case report
A 27 year old woman, gravida 1 + 0 presented to an accident and emergency department complaining of abdominal pain. She had returned from a holiday in Spain two weeks previously, and for one week she had experienced diarrhoea, which contained flecks of blood. Admission was precipitated by the onset of abdominal pain which was described as colic.

She was referred to an infectious diseases unit, where shortly after admission she was delivered of a fetus. She had been taking a combined oral contraceptive and had not noticed any menstrual irregularity. An evacuation of retained products of conception was then carried out, and she made a swift recovery and was discharged the following day.

Pathological findings
The fetus and placenta were received fixed in formalin. The fetus had a crown-rump length of 95 mm and a foot length of 20 mm. These suggest a gestational age of about 16 weeks. The placenta showed no gross abnormality, but histological examination showed focal infiltration of villi with acute and chronic inflammatory cells. In the centre of these lesions there were areas of necrosis, with the formation of microabscesses. Villi in intervening areas were normal. There was also pronounced chorioamnionitis with focal infiltration of the membranes with acute inflammatory cells and areas of necrosis. In places these areas were contiguous with the inflamed villi. Histological examination of the placenta showed no evidence of infection. The curedret retained products of conception were also received and included placental tissue showing the same features as the remainder of the placenta.

The retained products of conception and faeces were received for bacteriological investigation. As a history of diarrhoea had been given both were inoculated on to enteric as well as routine culture media, although this was not routine laboratory practice. Both specimens yielded growth of an organism subsequently identified as C jejuni biotype I. Serotyping showed that the organisms were identical. A high vaginal swab was received several days later, and this also yielded an identical organism. No other bacterial pathogen was identified in any of these specimens.

Discussion
Members of the genus Campylobacter have been implicated in the pathogenesis of several human and animal diseases. C fetus causes abortion and infertility in animals, particularly cattle. The pathogenesis of most cases of bovine reproductive tract disease is believed to be endometritis and salpingitis caused by the venereally transmitted pathogen, although septicemia with localisation of the pathogen to the placenta can also occur after the ingestion of infected material. This second route of infection is more common in sheep. The histological appearances in cattle reflect the route of infection, with chorioamnionitis spreading to affect numerous chorionic villi. The fetus is lost due to resulting circulatory disturbance.

In humans the exact species of campylobacter responsible for previously reported productive disease is not known because the organisms
were not classified by currently accepted criteria, but *C. fetus* has probably been responsible for 10 previously reported human abortions. Thermophilic campylobacters, including *C. jejuni* and *C. coli*, have been identified in 11 previously reported cases, but many of these were not investigated with the hippurate hydrolysis test that is required for further identification.

Clinical features of this case are similar to those previously reported, with abortion occurring in the second trimester, and associated with a mild maternal illness consisting of diarrhoea and fever.

Histological examination of the placenta was not included for many of the previously reported cases, but the existing descriptions are all similar, with perivillous fibrin deposition, an inflammatory infiltrate of neutrophil polymorphonuclear leucocytes, and microabscess formation. In sharp contrast to the bovine cases, there has been no evidence of chorioamnionitis in all the cases reported to date. The presence of this feature in this case raises the possibility of ascending infection rather than septicaemic spread, and this may therefore be an alternative route of infection in humans.

The recognition of *Campylobacter* species as a cause of diarrhoea was delayed because they have fairly exacting cultural requirements and will not grow with the incubation and media regimens that are commonly used. They can, however, be reliably cultured and identified under suitable conditions. This realisation has led to their frequent detection in faecal specimens.

The finding of unexplained villitis with negative bacteriological investigations in spontaneous abortion is not uncommon, and it is possible that some of these cases are in fact due to *Campylobacter* species.

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**AgNOR counts and determination of malignancy in stromal tumours of the stomach and small intestine**

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**Abstract**

Twenty four primary stromal tumours of the stomach and small intestine were investigated by silver staining of interphase nucleolar organiser regions (AgNORs) in an attempt to obtain an objective criterion for prediction of malignant tumour behaviour. Malignant tumours tended to have higher AgNOR counts than their benign counterparts, but this increase was small and there was some overlap between the two groups. There was a correlation between the mean AgNOR count and the mitotic count. There was no correlation between tumour size and these two measurements. This study suggests that in these stromal tumours the AgNOR count is not a useful independent predictor of malignant behaviour.

Definitive histopathological distinction between benign and malignant stromal tumours of the gut is often difficult. It is widely accepted that the most discriminative criterion in distinguishing these groups is the mitotic count. The ability to predict an individual tumour’s behaviour is of great importance in planning the treatment and continuing care of the patient.

It has been proposed that an increased number of actively transcribing nucleolar organiser regions is a marker of malignancy and that staining these structures by the AgNOR technique may be useful in the diagnosis and assessment of prognosis in some tumours. This study investigated whether the enumeration of AgNORs in stromal tumours of the stomach and small intestine is useful as a diagnostic method to distinguish benign from malignant...