Abstract

Colonies of Escherichia coli are commonly found in the feces of animals and sometimes as normal flora. However, in some cases, it can cause severe disease. Colon counts and the number of virulence factors detected are the main criteria for the differential diagnosis. In a preliminary effort to discern whether the colonies picked from the plate is the probable E. coli strain causing the scours, three to five additional colonies of varying morphology were chosen for genetic characterization.

Materials and Methods

Results

Discussions and Conclusions

According to PFGE results, the majority of cases did contain more than one E. coli isolate. However, 52% of cases contained at least one experimental isolate identical to the clinical isolate.

24% of cases were reported as positive for one or more VF by the NDIVDL. However, the current study determined that 47% of cases were positive for one or more VF.

82% of all cases showed resistance to 4 or more experimental antibiotics.

E. coli grouping appears to be unrelated to the pathogenicity of scours.

E. coli characteristics different from clinical isolates were recovered from many of the cases. One may conclude from this statement that multiple colonies from any given fecal sample should be used for vaccine and antibiotic resistance testing to ensure the proper ecological agent has been identified. However, questions arise as to whether this may be a realistic plate of action.

Is it cost effective to test multiple colonies and more importantly, will the consumer be willing to take on this extra expense?

Do more virulence factors need to be explored or is this conclusion having been drawn to cause disease?

What is the limit to the number of isolates to be tested to determine the appropriate antibiotic treatment and again, is this cost worth the extra time and money?

Will there be conflicts with time constraints or technical and material resources to be able to isolate multiple E. coli?

Further research may involve a larger number of scour cases, other virulence factors, and additional antibiotic resistance testing of isolates by the Veterinary Diagnostic Laboratory method. The Escherichia coli strain sensitivity with the following antibiotics currently used: Amoxicillin, Ceftriaxone, Cloxacillin, Cefotaxime, Cefoperazone, Ceftriaxone, Gentamicin, Kanamycin, Neomycin, Pefloxacin, Tobramycin, Amikacin, and Tetracycline.

A possible scenario to consider is that other factors and alternative methods may need to be explored when determining the best course of action for scour treatment. A single colony may be a good representation, but other factors in terms of virulence and antibiotic resistance could be overlooked.

Discussion

Characterization of Multiple Morphologically Different Escherichia coli Colonies
From Individual Diagnostic Cases

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Effect of the cases with the same antibiotic profile, 3 cases had isolates with GTCCCTAGCTCAGTATTATCACCT. A total of 9 cases contained experimental isolates testing positive for one or more VFs when the associated clinical isolate tested negative.

Of the 38 cases, 35 contained one or more experimental isolates identical to the clinical isolate. Of the 38 cases, 35 contained one or more experimental isolates identical to the clinical isolate.

75% of cases tested negative for all virulence factors (VFs) among both clinical and experimental isolates.

A total of 9 cases contained experimental isolates testing positive for one or more VFs when the associated clinical isolate tested negative.

Percent Isolates Resistant to Particular Number Antibiotics

Clinical vs. Experimental

Percent of Cases with Positive PCR Results

Number of PFGE Profiles Within Individual Cases

Table 1: Primers used in Virulence Factor PCR

<table>
<thead>
<tr>
<th>Primer</th>
<th>Forward 5’</th>
<th>Reverse 5’</th>
</tr>
</thead>
<tbody>
<tr>
<td>LosA</td>
<td>GM-TGATGCAAATC</td>
<td>GM-GAGGAACGGC</td>
</tr>
<tr>
<td>Fro1</td>
<td>GM-GGGTTTGGT</td>
<td>GM-AGGCAAGCGC</td>
</tr>
<tr>
<td>VirA</td>
<td>GM-TGATGCAAATC</td>
<td>GM-GAGGAACGGC</td>
</tr>
<tr>
<td>InaA</td>
<td>GM-GGGTTTGGT</td>
<td>GM-AGGCAAGCGC</td>
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<tr>
<td>Intimin</td>
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<td>GM-GAGGAACGGC</td>
</tr>
<tr>
<td>K1</td>
<td>GM-GGGTTTGGT</td>
<td>GM-AGGCAAGCGC</td>
</tr>
<tr>
<td>STX1</td>
<td>GM-TGATGCAAATC</td>
<td>GM-GAGGAACGGC</td>
</tr>
<tr>
<td>STX2</td>
<td>GM-GGGTTTGGT</td>
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References