FrontLine
TECHNICAL INFORMATION FOR TODAY'S FEED PROFESSIONAL

Feeding Colostrum by Bottle or Esophageal Feeder: Does it Matter?

Introduction

Colostrum management is of critical importance for maximizing calf health. Multiple factors influence passive transfer of immunity from colostrum including quality, quantity, quickness, and cleanliness. Current recommendations call for the 1st colostrum feeding to be delivered within 4 hours of birth, and colostrum is normally fed via nipple bottle and/or esophageal feeder. The most recent NAHMS (2007) survey indicated that 52% of heifer calves were fed colostrum via bucket or nipple bottle, while 12.4% of heifer calves were administered colostrum using an esophageal feeder.

Does Method of Feeding Affect Passive Transfer of Immunity?

The objectives of a recent study were to determine whether the method of colostrum feeding (nipple bottle or esophageal feeder) and the volume of the 1st colostrum feeding (1.5 vs 3 L) impacted passive transfer of immunoglobulin G (IgG) in newborn dairy bull calves (Godden et al., 2009).

Rationale – During normal suckling, esophageal groove closure results in the colostrum bypassing the forestomach (reticulum and rumen) to the omasum and abomasum, which results in shorter transit time to the small intestine where (IgG) absorption occurs. Conversely, an esophageal feeder does not trigger esophageal groove closure resulting in colostrum deposition into the forestomach. This delay in colostral IgG transit to the site of absorption may coincide with the progressive decline in IgG absorption efficiency over time (i.e., gut closure) resulting in lower serum IgG concentrations.

Materials and Methods – Calves were assigned to one of four treatments:

- Small volume, bottle (SmB) – 1.5 L of reconstituted colostrum replacer, 100 g IgG, fed by bottle
- Small volume, tube (SmT) – 1.5 L of reconstituted colostrum replacer, 100 g IgG, fed by esophageal feeder
- Large volume, bottle (LgB) – 3.0 L of reconstituted colostrum replacer, 200 g IgG, fed by bottle
- Large volume, tube (LgT) – 3.0 L of reconstituted colostrum replacer, 200 g IgG, fed by esophageal feeder
- Not all calves fed by bottle voluntarily consumed their entire 1st meal, so any remaining volume after 10 minutes of bottle feeding was fed by esophageal feeder.

Results & Discussion

Table 1. Effect of meal size and feeding method on passive transfer indices of newborn calves

Parameter	SmB	SmT	LgB	LgT
Calves, n	24	24	24	25
IgG fed, g	100	100	200	200
24-hr serum IgG, mg/mL	12.50[a]	9.85[b]	19.65[c]	18.65[c]
24-hr serum total protein, g/dL	5.30[a]	4.96[b]	5.84[c]	5.87[c]
Apparent efficiency of absorption (IgG), %	51.07[a]	40.47[b]	41.07[b]	39.04[b]
Calves w/ failure of passive transfer, %	0[a]	58.3[b]	0[a]	0[a]

[a,b,c]Values within row with unlike superscripts are significantly different ($P < 0.05$)

- 62.5% (15/24) of LgB calves voluntarily consumed the entire 3 L by bottle
- 37.5% (9/24) of LgB calves were fed by both bottle and esophageal feeder; average voluntary consumption of these calves was 2.13 L (range of 1.1 to 2.8 L)
- Passive transfer indices did not differ among LgB subgroups

Conclusions

- For calves fed a small volume of colostrum (1.5 L or 1.59 quarts) containing 100 g IgG, feeding with an esophageal feeder led to significantly greater incidence of failure of passive transfer
- Colostrum feeding method did not affect passive transfer indices in calves fed a large volume of colostrum (3 L or 3.17 quarts) and 200 g of IgG
- Increasing IgG mass by feeding more volume lessens the impact of feeding method on indices of passive transfer
- This study further confirms that increasing the amount of IgG fed will produce more consistent results

References

Godden et al., 2009. J. Dairy Sci. 92:1758-1764.
NAHMS. 2007. Available at http://nahms.aphis.usda.gov/dairy/dairy07/Dairy2007_PartI.pdf

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