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MANAGEMENTAL APPROACH OF THE COW DURING TRANSITION PERIOD

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Abstract: Smooth transition from pregnancy to lactation is essential for the better productive and reproductive performance of the dairy cattle. Failure in transition leads to lowered milk production, immunosuppression, poor reproductive performance. Decline in Dry Matter Intake (DMI) results in negative energy balance (NEB). There will be increase in level of NEFA and ketone bodies in blood. This predispose the animal to metabolic disorder like milk fever, ketosis and increase the incidence of mastitis, affects the productivity of the cow.
Keywords: NEFA, DCAD, negative energy balance, phases of transition period

Introduction

Transition period is defined as time frame from 3 weeks before calving to 3 weeks after calving. Feeding during transition period determines the cows productivity during the preceding lactation period. Providing the right nutrition during this period greatly improve the calving ease, cow and calf welfare, milk production and reproductive performance.

Physiological changes

As the calving approach, blood progesterone level decreases, estrogen level increase. This influence the feed intake of cattle, as a result DMI (dry matter intake) decreases. During the last week of pregnancy, fetal calf and placenta require greatest energy but DMI decreased by 10 -30 % compared with the intake during early dry period.

After calving, for the initiation of milk synthesis and rapidly increasing milk production, high amount of energy is needed. But total intake energy after calving is usually less than energy requirements. This leads to negative energy balance (NEB). As a result of NEB, suppression of immune system occurs which leads to decrease in immunity and increases the incidence of environmental mastitis during calving.

The periparturient period in dairy cows is characterized by profound endocrine and metabolic changes to meet out the milk production during early lactation. Increased GH concentration during early lactation stimulates hepatic gluconeogenesis to increase glucose

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supply. Simultaneously, GH also creates an insulin resistance, which prevents the glucose utilization by the liver, muscle, or adipose tissue and stimulates lipolysis, which mobilizes the fatty acids (mainly non-essential Fatty acids) for milk fat synthesis or used as an energy source to some extent in the postpartum cow. Altogether, the gluconeogenesis-mediated more glucose production and lipolysis-mediated fatty acids are directly available for milk synthesis.

Glucose demand is more during early lactation, resulting in hypoglycemic state. Inadequate glucose supply leads to the incomplete or partial oxidation of non-essential Fatty acids, which increases the ketone bodies concentration (primarily Beta hydroxyl butyric acid) during early postpartum period. This excessive blood Non-Essential Fatty Acids and Beta Hydroxyl Butyric Acid unwanted peripartum complications.

COMMON METABOLIC DISORDERS

1. RUMEN ACIDOSIS

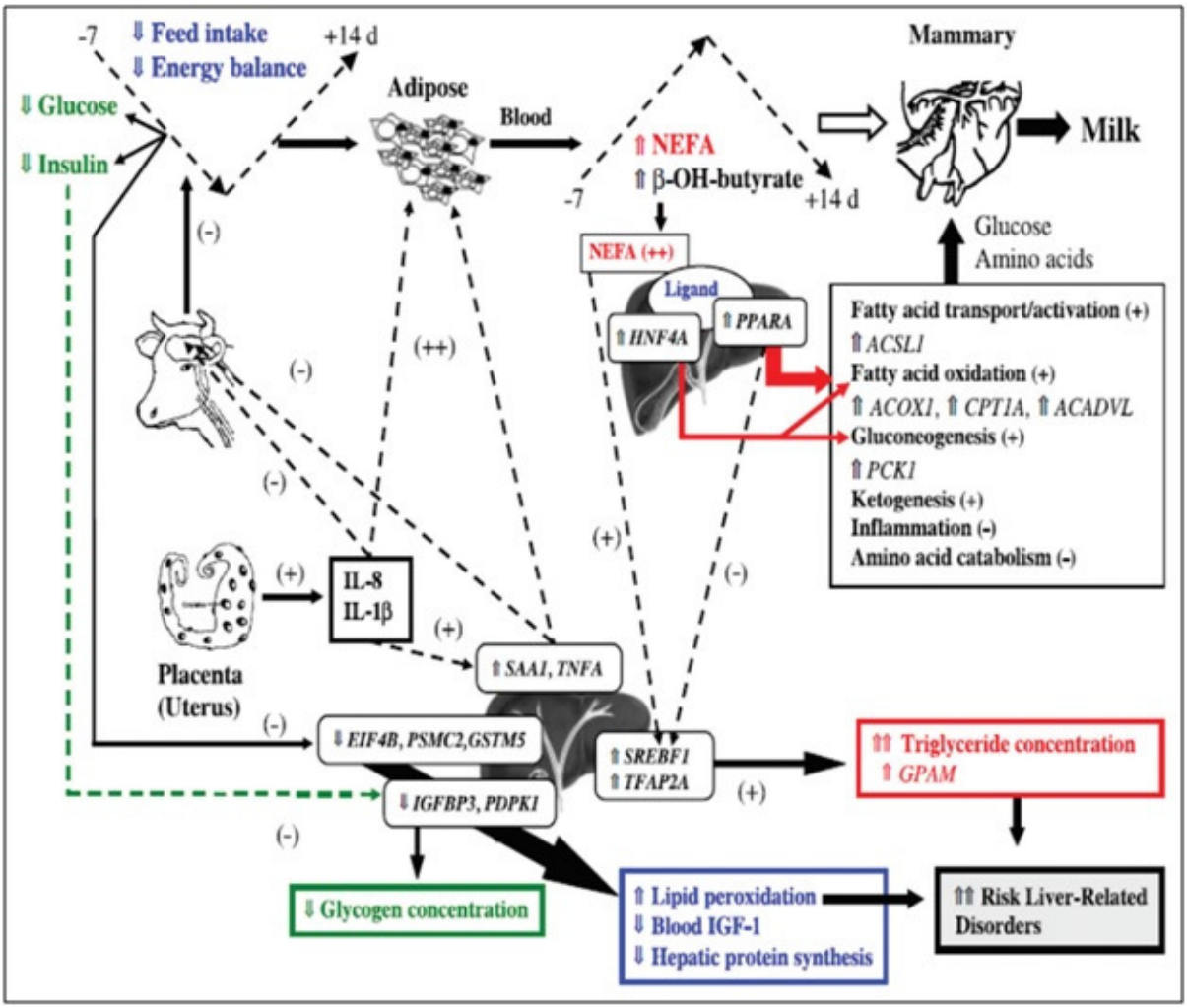
Excessive acidic pH caused by greater fermentation and acid production by microbes that can be neutralized by the animal. The causes of acidosis are intake og high amount of easily digestable carbohydrate and too little fibre. Acute cause of acidosis is death. Prevention of acidosis is to avoid ‘slug’ feeding and balanced starch/ fibre fractions of diet.

2. KETOSIS

The excessive mobilization of body fat caused by an imbalance between glucose need and glucose supply that leads to a built up of ketone bodies in the body. High demand for glucose (milk production or fetal growth) relative to supply (feed intake) leads to decreased glucose in blood and low insulin. The increase in ketone body concentration comes from beta-oxidation of long chain fatty acids in the liver. Prevention of ketosis is by avoiding over feeding (Fat cows have poor appetite), provide ample amount of well balanced diet and administer Niacin.

3. MILK FEVER (PARTURIENT PARESIS)

An decreased in blood calcium in response to Calcium drain of lactation causes milk fever. Feed intake drops at calving and the cation- mobilizing system is inactive at calving thereby reduction in calcium in blood and as compensatory mechanism parathyroid hormone and vitamin D try to increase blood calcium but the target tissues are unable to respond to hormonal signals. Symptoms are decreased appetite, staggering, animal recumbent and cold ears. Prevention of milk fever is by feeding low calcium diet and high phosphorus during the dry period.



Goals of nutritional and environmental management during this period can be summed up as:

- Maintain (or enhance) immune function.
- Minimize the extent of body fat mobilization around calving.
- Maintain blood calcium at and after calving.
- Maximize the appetite of the cow at and after calving.

Phases

For optimal management, the transitional period is divided into

1. Far – off Dry period

This the phase period from drying off to 21 days before calving where there is no milk production and rapid growth of fetus occurs. Adaptation of the rumen environment to high energy diet which will be fed to the cow post partum, by challenge feeding. Force feed of trace minerals and vitamins, limited intake of salt and close monitoring of the calcium and

phosphorus intake prevent the occurrence of metabolic disorders like milk fever, ketosis, acidosis.

2. Close up period

It is the phase of last 7 to 14 days before calving in which there is a increase in nutrient requirement but dry matter intake decreased by about 10-30 %. In order to compensate for the nutrient loss by reduced dry matter intake, nutrient density should be increased. Nutritional management of macro minerals is important to enhance lactation and reproductive performance of the cow during postpartum.

3. Fresh cow period

It is the phase of full lactation

A balanced transition diet

A balanced transition diet must have the right amount of energy, protein, fibre, calcium, magnesium, phosphorus and trace elements and the right DCAD level. Dietary Cation- Anion Difference (DCAD) is the difference between the cations (sodium and potassium) and anions (chloride and sulphur) in diet. Feeding anionic diet increases H+ ions (creates acidosis). If cations are fed HCO_3 is released (creates alkalosis).

$$DCAD = meq\ (Na + K) - (Cl + S)/\ 100g\ DM$$

To calculate DACD the expression is: [%Na divided by .023) + (%K divided by .039)] – [(%Cl divided by .0355) + (%S divided by .016)]

CHALLENGE FEEDING

Challenge feeding has to practice during this period. Feeding of concentrate mixture mixture should be started initially with 500g /day and increase it gradually to a level of 500-1000g / 100kg body weight. The challenge feeding is given for ruminal adoption of the cow. Mobilization of fat is prevented by feeding high fat, high protein oilseeds such as cottonseed which supply both protein and long chain fatty acids

General recommendation of structural carbohydrate (fibre) in total ration is 30 to 32% of DM and non-structural carbohydrate is 35 to 40% of DM.

Protein is given in high level to prevent ketosis, it increases the amino acids availability and there by minimize the mobilization of fat. Protein in transition diet is included at the level of 12% for dry cow phase, 14% in close up phase and at the level of 19% in fresh cow phase. Protein is given to the cow to prevent the incidence of ketosis where it increases the aminoacid availability and minimizes the mobilization of the fat.

The immediate disorder noticed after the parturition is milk fever or subclinical hypocalcemia due to dietary cation-anionic difference during the prepartum period. Vitamin E and vitamin A given to the cow through feed improve the immunity of the cattle thereby reducing the incidence of mastitis and retained placenta condition. Vitamin E is supplemented to close up and fresh cow at the level of 1000 IU/day and vitamin A at the level of 10000 IU/day.

SUMMARY

Excellent nutrition and feeding management during the transition period will help to maximize the dry matter intake after calving. Several management practices like proper body condition maintainance, feeding management, supplementation of excellent quality forages, proper contents of fibre and non fibre carbohydrates, attention to the cation – anionic balance of the diet and proper use of phase feeding approaches may prevent many disorders and increases production at a certain level.

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