1 Introduction

Amongst domestic farm animals, the metabolic diseases have great importance in dairy cows production because the producing dairy cow verges always on abnormal homeostasis. The breeding and feeding of dairy cattle for high milk yield are etiologically related to the metabolic diseases so they are common in these animals.

The incidence of metabolic disease increases in the period commencing at calving and extending until the peak of lactation (peri-parturient period). It is characterized by dramatic changes in nutrient demand that necessitate exquisite coordination of metabolism to meet requirements for energy, glucose, minerals and amino acids by the mammary gland following calving. If the nutrient reserves are not sufficient to supply high milk production, it may further reduce them to below critical levels and clinical metabolic disease occurs. The changes may be either variation in milk secretion or sudden variation in animals feed intake because of ingestion, digestion and absorption. These variations lead to change in the internal environment of the animal.

The fact that, some dams are affected much more by these variations than others, is probably explainable on the basis of variation in internal metabolism and degree of milk production between species and individuals or even within groups of cows. This seems to invoke genetic factors, at least as predisposing cause.

Liver metabolism in late pregnancy and early lactation in dairy cows is under a great deal of stress. The metabolic demands in these periods require that the liver synthesizes more glucose from non carbohydrates precursors because the cow in these periods is often in negative energy balance, therefore, mobilization of body fat to liver during periods of negative energy balance lead to deposition of fat in the liver and fatty liver syndrome may develop.

Ruminants may be prone to fatty liver because their hepatic tissue has limited capacity to export very low density lipoprotein also, a pre-partum surge of estrogen may contribute to the development of fatty liver in ruminants by increased fatty acid esterification along with limited export of triglyceride.

The diagnosis of the fatty cow syndrome is based on a history of excessive energy intake and the presence of one or more peri-parturient conditions such as displaced abomasums, retained fetal membrane and/or mastitis **(Morrow, 1976)**.

Diagnosis of fatty liver depends either on the estimation of the fat content in liver biopsy by chemical methods **(Reid and Roberts, 1983)** and the copper sulfate test **(Herdt et al., 1983)** or histologically as described by **Gaal et al.(1983)**, by examination of blood chemistry **(Reid et al., 1983b)** or ultrasonographically by using digital analysis (**Acorda et al., 1994a)**.

Phosphorus is found in every cell of the body and is considered to be vital part of many metabolic processes. The phosphorus content is somewhat variable according to the physiological status (pregnancy or lactation). Phosphorus deficiency is usually primary under field condition but may be exacerbated by deficiency of vitamin D or excess of calcium. It is characterized by pica, poor growth, infertility and increase of fragility of red blood cells. Primary phosphorus deficiency occurs with the first several weeks of lactation **(Radostitis et al., 2000)**.

Phosphorus deficiency may be of great importance in association with factors that affect energy intake and utilization. Generally, phosphorus inadequacy is accompanied by shortages of energy and protein.

According to available literature, there were very few systemic studies that have been conducted regarding to the relationship between fatty liver syndrome and hypophosphatemia in dairy cattle. For this reason, this work was found essential to be carried out and aimed to cover this shortage, moreover, to study the different methods for diagnosing fatty liver syndrome through the following ways:

1. Clinical examination of animal and classification according to disease condition.

2. Liver biopsy and estimation of total lipid in the liver with the copper sulfate test.

3. Laboratory estimation of total lipid and triglyceride in liver samples.

4. Comparison of blood phosphorus level and total lipid of liver.

5. Ultrasonographic examination of liver with special references to the measurements of the portal vein and gall bladder.

6. Investigation of the clinical and hematological picture of cows in relation to the fat liver content.