Study the levels of Calcium and Magnesium in the blood of sheep infested with tapeworms.

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Abstract:
This study was carried out to estimate Calcium (Ca) and Magnesium (Mg) levels in the blood of lactating ewes infested with tapeworms in comparison with those of healthy sheep. Worms were diagnosed by microscopic examination of stool samples to identify eggs and adult worms. Blood and stool samples of twenty two lactating Awassi ewes (aged between 18-24 months) were collected; 12 samples represented positive infestation with tapeworms by clinical investigation, fecal egg count (FEC) and packed cell volume (PCV) reported as percent. The results for blood packed cell volume of an individual ewe of this group fell below 20%, while (FEC) were above 1000 eggs per gram (epg), and 10 samples represented the control group whose fecal sample shows very low epg, while PCV was higher than 20%, with no clinical signs of parasitic infection. Tapeworms infestation in sheep causes a significant decrease in serum Ca levels, while no significant changes were observed in Mg level.

Keywords: Sheep; Tapeworms; Calcium; Magnesium.

Introduction:
Numerous physiological factors like infections (such as tapeworms) can produce variation in mineral concentrations in the blood of healthy sheep and cattle. There is no doubt that tapeworms cause ill effect to sheep and removing them gives a beneficial effect. Tapeworms still one of the major constraints to sheep health in the world. The tapeworm infection interferes directly on the productivity of sheep as well as an important cause of death in lambs. It competes with the host for the absorption of nutrient materials and vitamins such as vitamin B12, tapeworms lack the digestive tract and absorb nutrients directly across the skin or cuticle reducing the ability of absorption of the small intestines. Due to the presence of the adult tapeworm common symptoms like scouring, diarrhea, fatigue, severe anemia and hypo-proteinemia are seen, leading to depression, loss of condition, loss of weight, reduced productivity, and eventual death. The disease tends to be more severe in young kids and lambs, but mature animals can also be severely affected. The aim of the study is to evaluate calcium and magnesium levels in blood serum of sheep infected with tapeworms and compared with that of normal healthy sheep.

Material and Methods:
Feces and blood were collected from 22 lactating Awassi ewes from a farm in Baiji city, feces were collected directly from the rectum and processed using a modified McMaster technique for determination of fecal egg count with a sensitivity of 50 eggs per gram (FEC). Blood was collected by external jugular venipuncture using 10 ml disposable syringe with 21G needle, the blood sample was divided into two parts, 5 ml were put in EDTA tubes for PCV determination using hematocrit tubes spun in a microhematocrit centrifuge. The rest 5 ml of blood sample were put into clean dry plain tube, after allowing 30 min. at room temperature for blood to clot, the blood was centrifuged for 5 min. at 3000 rpm at room temp. to separate serum from blood cells for calcium and magnesium determination by atomic absorption spectroscopy. Based on clinical manifestation and laboratory results which include fecal egg count and packed cell volume, serum samples were divided into two groups.

Group One:
Ten samples considered as control group which proved not to have tapeworms infection.

Group Two:
Twelve samples which proved to have tapeworms infestation.

Both groups samples were examined for estimation the level of Ca and Mg. The reference range for serum Ca and Mg is 5-10.0 mg/dL (2.1-2.5 mmol/l), and 15.8-25.5 mg/L (1.3-2.6 mEq/L) respectively. Procedure: Ca and Mg by Atomic Absorption Spectrophotometry (AAS). Principle: Ca and Mg determination by AAS are based on the fact that atoms of an element in the "ground" or unexcited, state absorb light of the same wavelength (WL) as that emitted by the element in the excited state. Each element has its own characteristic absorption or resonance line.

Equipment: Perkin-Elmer AAS model 460 with a single slot burner head and calcium- magnesium hollow cathode lamp.

Statistical analysis: The data were examined for statistical differences using Students t-test, statistical significance levels were (P< 0.05).

Results:
The ewes were divided into two groups according to the clinical investigation, in addition to the results of (FEC) and (PCV) values, the ewe was consider infected with tapeworms when the results for PCV fell below 20%, and (FEC) were above 1000 eggs per gram (epg) as shown in figure (1) and table (1) respectively.

The mean serum Ca level in the infected group was 6.72 mg/dL, which was lower than the level of serum Ca in control group 11.88 mg/dL. The above difference was statistically significant with p < 0.05. As shown in table (2).

The mean value of serum Mg in ewes in group two was 21.98 mg/L, while in control group the mean value of Mg was 24.74 mg/L. The results was statistically
insignificant p > 0.05, despite serum Mg\textsuperscript{2+} concentration in infected group was lower than serum Mg\textsuperscript{2+} concentration in control group as shown in table (3).
abomasum. Haiba, et al. demonstrated that liver fluke infestation in buffaloes causes a significant decrease in serum Ca levels. The mean level of serum Mg in infected group were lower than in control group but it was statistically insignificant. The result is similar to that of Haiba. This result may be due to the fact that the body needs calcium twice as much as magnesium in normal conditions, also magnesium is needed for proper calcium absorption. As a result, no calcium intake can be occur without magnesium intake.

**Conclusion:**
Tapeworm infestation increased the loss of calcium from intestine and lead to decrease of serum Ca level in infected animals compared with that of normal healthy sheep. This study confirms that internal parasites, or worms, cause economic and sheep production losses in the world.

**References:**
12- Haiba M. H., El-Rawii K. A., and Osman H. G. A comparative study on the levels of Ca, inorganic P and Mg in the blood serum and bile of the normal healthy buffalo (Bos bubalis) and those of buffaloes infested with liver fluke (Fasciola gigantica). J. Parasitology Research, 1964; 23; n 6; 527-531.