

Koumiss : its mode of preparation and its remedial value / by William Pepper.

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more food than can be advantageously taken in a solid form, milk has been found the best addition to the diet. It will be found, however, that in certain cases of all these groups milk is not well digested. No doubt the assurance so often given to us that milk cannot be taken is, for the most part, unfounded. But I have frequently met with cases where very careful trials convinced me that the statement was literally true; and, unfortunately, in not a few instances this has happened in the very cases where I was most desirous either of using an exclusive milk diet, or of giving a considerable amount of milk to eke out the insufficient quantity of solid food that could alone be digested. In these cases I have found very great advantage in resorting to koumiss as a substitute for milk. I have also found that this new article of diet is peculiarly applicable in certain conditions where milk is not specially indicated.

Before illustrating these statements by the brief notes of a few of the many cases in which I have used koumiss with advantage, a short account of this useful food may be given. It is essentially milk in which alcoholic fermentation has been induced, and allowed to proceed to a moderate degree. In Tartary, where it has been extensively used for centuries, mare's milk is employed; while in Russia, according to Liebig, cow's milk is chiefly used in its preparation. I am satisfied that koumiss made from cow's milk

is quite as good as that made from the milk of mares or of camels. It has also been supposed that some special ferment used in Tartary was more efficient than any other, but I believe that ordinary brewers' yeast answers the purpose equally well.

As koumiss will not bear transportation to any considerable distance, it is desirable that the mode of preparing it should be generally known. I have therefore requested Mr. George I. McKelway, of Philadelphia, who has supplied me with all the koumiss my patients have used, to give the formula for its preparation. He writes as follows: "The manufacture of koumiss is a very easy and simple process. I take—

R.	Best unskimmed milk,	qt.j
	Yeast (brewers' or old bakers'),	grs.c
	Cane sugar,	grs.cc.

"Keep the mixture at a temperature of 80° Fahr. until fermentation is quite brisk, stirring it frequently, and then bottle, carefully securing the corks with strong twine or wire. After twenty-four hours it is fit for use.

"The object of the addition of the cane sugar is the certain induction of alcoholic fermentation. If the sugar be left out the result is likely to be that lactic fermentation only is set up, and the product is sour milk. The quantity of sugar used has, of course, to be judged by the richness of the milk and its consequent richness in fermentable constituents."

The koumiss thus prepared by Mr. McKelway has proved entirely satisfactory. It is a very agreeable drink, having a slightly acid taste, and containing from three to four per cent. of alcohol, one to two per cent. of lactic acid, and is highly charged with carbonic acid gas. It contains the ordinary ingredients of milk, with the exception of the lactose (sugar of milk), most of which is converted into alcohol, and lactic and carbonic acids. Koumiss is acid to litmus paper, both before and after being freed from carbonic acid. Its specific gravity is rather less than that of the milk from which it has been made (1.040 instead of 1.043). As it is important to retain its effervescing character, it should always be drawn by means of a "champagne tap." It should be used within a few days of its preparation, since after two or three days the alcohol and lactic and carbonic acids increase so as to make it less agreeable and less well adapted to most cases. It should be kept on ice, or in a very cool place, as warmth soon causes the caseine to separate into a thick, heavy curd. Koumiss may be said, then, to fairly represent the nutritive properties of good milk, while possessing, in addition, a mildly stimulating character. The carbonic acid gas with which it is highly charged acts also as a sedative to the gastric mucous membrane, and thus renders it well adapted to cases where there is much irritability of stomach.

I have used koumiss both as an exclusive diet and as an addition to an ordinary diet. In the former case the amount taken has been, at first, two or three fluid ounces every two hours; then, in the course of a couple of days, four fluid ounces every two hours; then six fluid ounces every three hours; and finally half a pint every three hours, or two quarts in the course of a day and night. This total I have rarely exceeded, though in a few instances as much as three quarts have been taken, in divided doses. Usually, by the time two quarts had been taken daily for a short time, it has proved both possible and desirable to associate with it some simple solid food. When used as an addition to an ordinary diet, I have given it to the extent of one quart daily, in doses of half a pint in the intervals between meals. Formerly the high cost of this article was a serious objection to a prolonged use of it in large quantities, but now that it can be had at the rate of one dollar for three quart bottles, this objection has been largely done away with. I see no reason, however, why koumiss should not be made according to the above receipt, by any one who finds it inconvenient to obtain it from some of the recognized manufacturers, of whom there are several in Philadelphia and New York, if not elsewhere.

I must be brief in alluding to the conditions in which I have found its use most beneficial, among which may be first mentioned, catarrhal

phthisis. In this form of pulmonary disease, which, in this climate, is by far the most frequent variety of so-called consumption, the pulmonary trouble is often complicated with gastro-hepatic catarrh, either in a subacute form, or in the form of acute attacks recurring at irregular intervals. I think that all careful observers must have noticed how frequently in such cases milk disagrees, and oil cannot be taken. The difficulty of getting these patients to digest a sufficient amount of nourishing, fat-making food is, indeed, one of the most serious points in their treatment. I can confidently advise the use of koumiss in this condition. The patient can usually make three light and simple meals, and in addition half a pint of koumiss can be taken early in the morning, between breakfast and dinner, between dinner and supper, and toward bedtime. A special advantage to be here noted is, that when taken at night it not only agrees well, but exerts a mild soporific influence. It is probable that the high reputation enjoyed by koumiss as a remedy in phthisis in some distant parts of the world is due to its excellent action in many cases of the class I have alluded to.

As an illustration of another condition not rarely met with in phthisical patients, I may quote the case of T. W., aged 24, who applied to me with extensive disseminated disease in the left lung, with a glazed, moist tongue, fre-

quent vomiting, considerable diarrhoea, marked emaciation, and abundant expectoration. He lived on koumiss exclusively for two weeks, during the latter of which he took also small doses of eriodyction as an alterative expectorant. After the first day there was no more vomiting or diarrhoea. During the third week small quantities of solid food were given, in addition to the koumiss. In the fourth week skimmed milk was substituted, and now, at the close of five weeks, he takes one and a half quarts of milk daily, besides a fair amount of solid food, all of which is thoroughly digested. He has gained five pounds in weight, and considerably in strength; cough and expectoration have diminished, and there is slight improvement in the physical signs. Fluid extract of eriodyction has been given steadily, and for the past two weeks six grains of quinia have been taken daily.

As an exclusive diet, koumiss is adapted to all those cases where we employ milk in this way with such remarkable results, but, of course, it would have no special advantage, except in those peculiar instances where milk cannot be digested. Thus I have met with several cases of cardiac disease, with marked secondary hepatic and gastric congestion, where skimmed milk could not be digested, and where it was almost impossible to find any article of food that the patient could take, in which koumiss was used.

with entire success. In one such case, seen in consultation with Dr. Hollingsworth Neill, the patient, who had been suffering greatly from gastric distress, aggravated by all kinds of food, received immediate relief from the use of koumiss, which was taken with great relish for a long time.

As an illustration of its value in another kind of cases, I may refer to a patient with extreme nervous exhaustion and intense anæmia, who suffered violently from pyrosis and gastralgia. While out of bed it was impossible to secure improvement. Even when complete and prolonged rest in bed was secured, with the aid of massage, general electrization and faradization, it was equally impossible to feed her sufficiently, so as to lessen the anæmia and relieve the distressing nervous symptoms. Milk was tried repeatedly, and always disagreed; its use, even in small quantities at stated intervals, caused intense distress. Iron could not be tolerated in any form; suppositories containing iron caused rectal irritation; hypodermic injections of dialysed iron (Wyeth's) caused abscesses. The internal use of the latter preparation of iron, as well as of many others, even in the smallest dose, produced suffering. In this trying condition, koumiss proved perfectly acceptable, and for a number of weeks the patient used it, first as the sole article of food, and later in addition to a very simple diet, with excellent results. Flesh

was gained, strength increased, and the general nervous symptoms and the gastric distress rapidly improved.

It will immediately occur to many that koumiss must prove a very valuable remedy in diabetes mellitus, and so it does. I have had the opportunity of using it only in one such case, but here the immediate reduction in the amount of urine, almost to the normal, and the remarkable diminution in the proportion of sugar, showed conclusively its great importance as an exclusive article of diet in this affection. A diet of skimmed milk is often found of great service in relieving the symptoms in diabetes, but koumiss will probably be found much more desirable, since the sugar of milk is, for the most part, decomposed, while the carbonic acid gas acts as a grateful sedative to the irritable stomach. I think, moreover, that koumiss allays thirst better than milk does.

In the following case of simple polyuria, koumiss produced very marked and rapid results. E. S., a sailor, aged forty-three years, was admitted to the University Hospital, Dec. 20, 1877. He had had diarrhoea for three months, had lost a great deal of flesh, and was pale and weak. He complained greatly of thirst, and passed ten pints of urine daily, of low specific gravity, and containing neither albumen nor sugar. A diet of skimmed milk, with injections into the large intestine of weak solutions of nitrate of

silver quickly arrested the diarrhoea, but produced no effect on the polyuria. He was then allowed a mixed diet, and dialysed iron and ergot were given him for more than two weeks, in very large doses, but only a very slight decrease in the amount of urine followed, from ten to eight and a half pints, and he continued to lose color, strength and flesh. On January 30th all medication was stopped, and he was ordered to bed. The next day he was put on an exclusive diet of koumiss, one quart being given in the course of twenty-four hours. This was continued for one week, with the following effects: He lost three and a half pounds in weight, and passed urine on the successive days as follows: January 30th, eight and a half pints; January 31st, eight and a quarter pints; February 1st, four pints, two ounces; February 2d, two pints; February 3d, one pint, ten ounces; February 4th, one pint, seven ounces; February 4th, one pint, eleven ounces.

On February 6th solid food was conjoined with the koumiss, and finding that no increase in the amount of urine occurred, the latter was discontinued, and he was allowed to eat as much as he wanted, of simple, nourishing food. His appetite was very good, and he ate freely, without the least inconvenience. His weight increased, according to the careful observations of my resident physician, Dr. Skillern, and of the head nurse, no less than twenty-one pounds

in seven days. The extraordinary change in his appearance confirmed this statement, and I have no doubt of its entire accuracy. He soon felt perfectly well; there was not the least return of polyuria, and he was discharged to return to his calling.

I have thus briefly alluded to some of the conditions in which I have found koumiss of positive value. The results I have already obtained convince me that in suitable cases it will prove an important addition to our means of treatment.

