

Changes in the acid-base balance of uterine blood in cases of pelvic congestion, before and after treatment

by

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Pelvic circulatory changes of obstetrical or gynaecological origin are often difficult to assess quantitatively from the clinical point of view. We have previously described a method^(1,2) for direct measurement of circulatory stasis at uterine level which is simple to carry out, not distressing and clinically valid. The congestion resulting from displacement of the uterus is easily discovered on the operating table and is also easily corrected by surgery: therefore it lends itself particularly well as a check of the validity of a method of measurement. Such a method is based on the following physiopathological presuppositions.

The gaseous exchanges between blood and tissues happen mainly at the capillary level: the blood which arrives from the afferent arteriole is almost saturated with oxygen, carried mainly by haemoglobin, and has only a low partial pressure of carbon dioxide.

At tissue level, this blood comes into contact with an environment characterized by a low partial pressure of oxygen and a high partial pressure of carbon dioxide, so that, by opposing pressure gradients, oxygen passes from the blood to the tissues and, at the same time, carbon dioxide from the tissues to the blood. In this way, blood in the efferent venule has a lower content of oxygen and a higher content of carbon dioxide. The extent of these exchanges depends on the extent of tissue respiration and on the time for which the blood remains in the capillary bed. When there is a slowing of the speed of circulation, the composition of all capillary blood tends to be similar to that of the venous blood; the oxygen content diminishes and therefore a predominantly anaerobic metabolism takes place in the tissues with accumulation of lactic, pyruvic, oxaloacetic and β -oxybutyric acids.

The purpose of the present study is to test further the validity of the method which has been developed by evaluating the effect of surgery which is able to correct pelvic congestion on the composition of the uterine blood.

EXPERIMENTS AND RESULTS

The study was carried out on 15 patients, average age 29 years, who had menstruated regularly and who had retroverted uterus with symptoms of pelvic congestion as shown by heavy pain without clearly defined characteristics, originating in and referred to different localisation. Before the operation, uterine capillary blood was taken from the anterior lip of the cervix in an area in which there were no lesions visible with the colposcope, by making a circular microincision 2mm in diameter and 2mm deep. A thin film of vaseline, which makes the area water repellent, helps the removal of heparinized capillary blood, reducing

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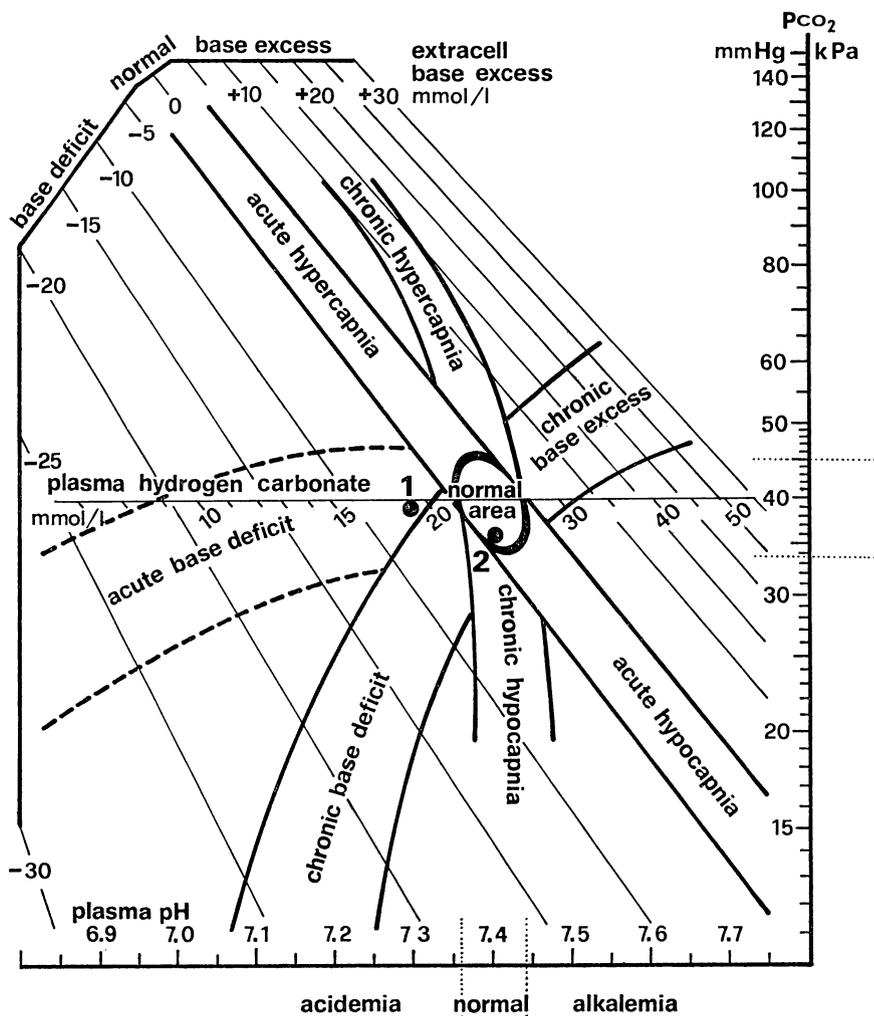


FIG. 1 - Graphic representation of the acid-base balance (1) before and (2) after hysteropexy.

the gaseous exchange with the atmosphere to a minimum. 60 μ l of blood are sufficient for the determination in duplicate of the acid-base balance with the micromethod. The patients then underwent hysteropexy according to Baldy-Webster during which a very marked congestion of the pelvic viscera was always seen. Some months after the operation (after a lapse of between 2 and 9 months), the determination on the uterine capillary blood was carried out again with identical procedure.

RESULTS

Where there is pelvic congestion because of displacement of the uterus confirmed at surgery, the uterine capillary blood shows « acute base deficit » if the

Table 1. *Acid-base balance of uterine capillary blood in patients with retroversioflexed uterus with pelvic congestion.*

	pH	pCO ₂ mmHg	BE _m mol/l
Average	7.30	39.7	-5.7
Standard deviation	±0.07	± 7.3	±2.9
Standard error	±0.02	± 2.2	±0.8
P	< 1%	< 1%	< 1%

Table 2. *Acid- base balance of uterine capillary blood in the same patients after hysteropexy.*

	pH	pCO ₂ mmHg	BE _m mol/l
Average	7.40	35.3	-1.2
Standard deviation	±0.03	± 8.3	±2.7
Standard error	±0.01	± 2.7	±0.7
P	< 1%	< 1%	< 1%

Table 3. *Statistical significance of the difference before and after hysteropexy.*

	Difference	P
pH	+0.10	<1%
pCO ₂ mm Hg	-4.40	<5%
Base excess meq/l	+4.50	<1%

values are plotted in the « acid-base chart » of O. Siggard-Andersen. This indicates an acute production of non-volatile acids connected with anaerobic metabolism. After hysteropexy, pelvic circulation returns to normal and capillary blood shows an acid-base balance within normal limits. The difference is statistically significant (Table 3).

DISCUSSION AND CONCLUSIONS

Previous work had already shown that uterine malpositions which are accompanied by pelvic congestion alter the composition of the uterine capillary blood in proportion to the degree of circulatory stasis. Therefore, by correcting the displacement and removing the stasis, the biochemical alterations should recede. This has been shown to be so in the patient studied in this investigation: in all cases, repositioning of the uterus also normalized the metabolic picture. This confirms the validity of the diagnostic method developed by us which accurately shows the uterine circulatory situation, and also emphasizes the clinical value of hysteropexy operations when performed in cases accompanied by congestion. A preliminary biochemical examination is therefore important to differentiate the displacements which are accompanied by congestion and therefore those which can benefit from surgical operation.

The removal of the cause of altered venous return is definitely useful because it releases the uterine tissues from persistent anaerobiosis which, with the passage of time, would lead in most cases to the irreversible condition of uterine fibro-

sclerosis (hyperplasia of the intima of the blood vessels and increase in the muscular and connective tissue content of the organ). These observations clearly show that hysteropexy, in cases where it is indicated, can cure a situation which may otherwise lead to irreversible damage to the uterine tissues.

SUMMARY

Venous pelvic congestion caused by displacement of the uterus alters the acid-base balance of the uterine capillary blood. After hysteropexy, congestion is removed and the balance returns to normal.

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Therapy with mineral water containing sulphur in gynaecological conditions

by

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The beneficial effect of therapy with spa water in gynaecological conditions is supported by several physiopathological considerations. One of the simplest is the anti-inflammatory and antiseptic action which explains the positive results obtained with the use of a douch in chronic inflammation of the vagina and cervix. Because of its high concentration when spa water comes into contact with the mucose membrane fluid movement becomes established from the inside towards the outside which carries bacteria, toxins and products of inflammations with it; the mucose membrane behaves, therefore, as an inert semipermeable membrane where the surface cells have lost their property of selective absorption^(15, 32, 34).

Waters which contain iodine salts or sulphur show considerable anti-inflammatory properties because of their ammonium chloride content and they also possess and antibacterial property which can be attributed to changes in the pH of the medium. It has been shown that therapy with spa water can effect a considerable influence on the physicochemical properties, colloidal balance and chemical composition of blood plasma and also on the red blood cells, influencing their sedimentation rate⁽⁴⁷⁾.

It appears, also, that therapy with spa water facilitates the processes of non