

Primary evaluation of homeopathic remedies injected via acupuncture points to reduce chronic high somatic cell counts in modern dairy farms

Dr. Sagiv Ben-Yakir, BSc, DVM, MRCVS

ORSHINA - The Israeli Veterinary Institute for Holistic Medicine
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Introduction

Modern dairy herds work under continual demand for high performance in terms of milk quality and quantity. Most countries provide veterinary care on a national scale, with coordination between state- and private-interests. In the State of Israel, the mean annual milk yield for 98,485 Holstein herd book registered cows is 10,469 kg/cow with 3.26% fat, and 3.07% protein⁽¹⁾. As in many modern western countries, the Israeli dairy system is centralized, and various organizations are involved and multi-connected (Israeli State Veterinary Services, Israeli Cattle Breeders' Association, Milk Marketing Board, and cooperative and non-cooperative veterinarians). Herd health monitoring is done routinely, and as part of the general data collecting regime each cow is checked once a month for somatic cell counts (SCCs) in four quarters.

Normal milk should contain only low levels of somatic cells. High somatic cell counts (SCCs) in milk indicate mastitis, subclinical or clinical, with reduced quality and quantity of milk. Most of the cells are white blood cells, with some epithelial cells from mammary secretory tissue. Epithelial cells in milk are part of normal bodily function; they are shed and renewed in normal bodily processes. Normally occurring white blood cells serve as a defense mechanism to fight disease, and assist in repairing damaged tissue.

The milk market relies on SCCs to aid in ensuring a quality product. SCCs are monitored to show compliance with national standards. The SCC is assessed in milk taken from the four quarters and mixed before testing. Most markets pay a premium for milk with a low SCC and penalize farmers for a high SCC (above a mark value, usually >350,000 cells/ml). If the SCC is very high, the milk may be declared unmarketable, and the farmer may face other severe sanctions. During routine activities on dairy farms, cows suffer from repeated minor traumatic events, especially to the udder. This can arise, for example, in faults in the milking machinery (liner slip, vacuum faults, incorrect pulsation ratios, stray electric voltages on the milk-line etc.), or teat-treads in badly designed cubicles, in rushing cows with pendulous udders. These traumas can irritate the teats or udder tissues, and can induce subclinical or clinical mastitis and high SCCs.

Our pilot test was done to see if we could reduce a high SCC (>350,000 cells/ml) to normal values (<350,000 cells/ml) by injection of specifically selected homeopathic remedies to particular acupoints, and to compare injection of saline (saline aquapuncture) or homeopathic remedies (homeo aquapuncture) to real and sham acupoints.

Materials and methods

Injectable veterinary remedies should be sterile and ready for use. They should be easily available and should contain normal saline (0.9%) but no alcohol. For repeated use of a remedy, the manufacturer's quality control should ensure ampoule-to-ampoule and batch-to-batch consistency in composition. The remedies manufactured by Heel GmbH (Germany) meet these characteristics, and we used their solutions. The Appendix lists their composition.

Traumeel is considered to be the primary homeopathic combination remedy to treat and heal trauma-induced injuries in animals^(2,7). Due to its homeopathic constituents, Traumeel's main effects are regenerative, anti-exudative and anti-inflammatory. Cows with subclinical chronic mastitis cannot repel different exogenous pathogenic factors (EPFs) invading the udder tissue. We add a homeopathic remedy that will stimulate the body's own defense mechanisms to expel any undetected EPFs, as well as having a beneficial action on the mesenchyma, and particularly on the lymphatic system in the udder to repel (detoxify) any possible exogenous factors. For this purpose we used **Engystol**⁽⁸⁾. The third homeopathic combination remedy was **Lachesis compositum**, a remedy specially indicated to prevent and treat bovine mastitis^(9,10).

The selected acupoints were: BL 25, BL 23, SP 18, SP 21 all bilaterally, and GV 03. "Veterinary Acupuncture"⁽¹¹⁾ gives the anatomical description of these acupoints, and their specific indications.

In this pilot test, 11 high yield cows were selected for the trial. These cows were chosen due to their excellent past performance, outstanding reputation in the country (good genetics and good performances), and SCCs far above the normal range (see table 1).



- 2 cows (405 and 953) had i.m. injections of saline (0.9%) into sham acupoints.
- 3 cows (156, 466, 816) had injections of saline (0.9%) into acupoints.
- 3 cows (956, 634, 696) had i.m. injections of homeopathic remedies into sham acupoints.
- 3 cows (166, 275, 946) had injections of homeopathic remedies into acupoints.
- On October 11 (Day 1), 10 ml saline, or 10 ml *Traumeel*, was injected/cow.
- On October 15 (Day 5), 10 ml saline, or 10 ml *Engystol*, was injected/cow.
- On October 22 (Day 12), 10 ml saline, or 10 ml *Lachesis compositum*, was injected/cow.

The saline or homeopathic remedy was injected into each of the 9 acupoints or sham points at 1.1 ml/point (total 10 ml). This was done to create the same pattern of injection for both the control and the experimental groups. The selected solutions were injected via 21 gauge, 30-mm needles after each area to be injected was cleaned manually, and washed with 70% alcohol, followed by Povidone-iodine.

Results

Table 1 summarizes the SCCs in all cows before and after the treatments were imposed. Although the number of cows in each group was small, and there was very high between- and within-cow variation in SCCs, the results were encouraging.

- The two cows that had **saline injections to sham points** showed no improvement; their SCCs remained very high.
- The three cows that had **homeopathic remedies injected at sham points** improved, but the SCC did not fall <350,000 cells/ml, as was desired.
- The three cows that had **saline injections into acupoints improved**, but the SCC did not fall <350,000 cells/ml, as was desired; the mean fall in SCC (Pre-Post) was 1,249,333 cells/ml.
- The three cows that had **homeopathic remedies injected at defined acupoints** showed remarkable results; their SCC fell below the target of <350,000 cells/ml.



Table 1. Milk SCC (10³ cells/ml) in 4 quarters/cow. The SCC of the first 4 months (July-Sep) were before the injections. The Nov SCC was after the end of the injections (the treatment-effect).

Treatment	COW #	Jul SCC	Aug SCC	Sep SCC	Oct SCC	Nov SCC (post-trial)	SCC change (Oct to Nov)
1. Sal-sham AP	405	1418	1819	1101	1523	2375	(-)
	953	1250	1491	3660	2770	2111	(+)
2. Hom-Sham AP	634	622	1073	490	364	980	(-)
	696	874	500	317	352	672	(-)
	956	3530	1340	1646	1295	618	(+)
3. Sal-AP	156	2740	3383	1025	891	633	(+)
	466	1707	1403	2558	461	614	(-)
	816	2539	1966	2832	932	614	(+)
4. Hom-AP	166	1216	1140	1890	472	261	(+)
	275	1234	5235	6124	624	313	(+)
	946	2097	1922*	2123	176	233	(-)

*Estimate based on the mean of the July and September values

Discussion

This preliminary clinical trial suggests that, compared to the other therapeutic procedures, acupoint injection with homeopathic combination remedies may reduce the SCCs of high-yield dairy cows with chronic non-responsive mastitis.

In bovine subclinical mastitis, the body's self-healing powers cannot cope well with the influx of different EPFs, as well as many traumas to the udder. By injection of specific homeopathic remedies, an immunological bystander reaction was stim-

ulated^(12, 13). *In-situ* macrophages phagocytize the minute quantities of injected ingredients in amounts too small to produce a complete immunological reaction. After phagocytosis, the macrophages return molecules of the ingested substances to their surface. These molecules ("motifs") are bound to the macrophage's membrane-related Major Histocompatibility Complexes (MHC's). Nearby naive and undifferentiated lymphocytes (Th0) recognize the "motifs", remove them from the macrophage, and bind them to their own receptors. This specific action is a signal for the Th0 to be transformed into regulatory lymphocyte (Th3), a committed lymphocyte. The Th3 cells wander into regional lymph nodes, and via cell division multiply to many "motivated and committed" cell clones. They leave the lymph nodes via blood vessels and reach all organs and tissues. The indicated motifs facilitate an increased penetration of the Th3 cells into the relevant area. Chemotactic factors (complement factors, chemokines etc.) from the inflamed area (the cow's udder) support this organo/histotropy. As soon as Th3 reaches their target organ (recognizing, similarity between their motifs and the target cells organ), Th3 cells immediately start to synthesize "Transforming Growth Factor- beta" (TGF-beta, the most potent anti-inflammatory cytokine in the body) and begin inducing Th2 to released interleukin-4 and -10, which support the effect of TGF-beta. This stops the inflammatory processes and regenerates normal udder tissue, thereby decreasing the SCCs.



Additionally, the concentration of mast cells is significantly higher in an acupoint than in "sham points" in control areas⁽¹⁴⁾. Mechanically, by causing local microtrauma, acupuncture *per se*, stimulates the mast cells *in-situ* to release their mediators⁽¹⁵⁾. These active mediators, including histamines, cause many local changes, such as phagocytosis⁽¹⁶⁾. The released mediators also cause vasodilation, increase capillary permeability, and trigger a cascade reaction. These induce migration of monocytes from the blood vessels into the local tissue. The monocytes become macrophages once they have gained access to the extravascular space, and further enhance phagocytosis, a reaction that is so important in the bystander reaction. It has been shown that the phagocytic activity of the monocytes was increased even before the migration to the local tissue⁽¹⁷⁾. One might say that the acupunctured arena serves as an amplifier for the bystander reaction.

Documented acupuncture effects on immunological responses include increase in white blood cell counts, especially T cells^(18, 19, 20) and attraction by chemotaxis of these cells to the punctured area, again, causing T cells to react to the presented "motifs" on the macrophages. Once the primary Th3 cells are "motivated", they begin to clone themselves in the lymph nodes. X-ray microscopy and electrophoretic studies of acupoints indicate direct pathways from the acupoint to the nearest lymph node^(21, 22), again providing the best possible terrain for the processing of the bystander reaction. From a very basic scientific understanding of the relationship between homeopathy, immunological bystander reaction, and their amplification by using acupuncture, we can begin to understand the mechanisms behind the success in our specific clinical trial to reduce bovine somatic cell counts to normal values.

Conclusion

These preliminary data suggest that, compared to the other therapeutic procedures, acupoint injection with homeopathic combination remedies reduced the SCCs of high-yield dairy cows with chronic non-responsive mastitis. Further research in this area is needed in relation to reduction of SCCs in chronic subclinical mastitis in highly stressed cows on modern dairy farms, and because of the small number of cows in each group and the very high between- and within- cow variation in SCCs.

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Appendix

Heel GmbH, Germany, supplied the homeopathic injections in 5 ml ampoules for veterinary use only. The D (decimal) dilution is equivalent to the X (1 in 10) dilution.

Traumeel ad us vet.: Each 5 ml injection ampoule contained: Aconitum napellus D4 0.3 ml, Aristolochia clematitis D11 0.25 ml, Arnica montana D4 0.5 ml, Atropa belladonna D4 0.5 ml, Bellis perennis D4 0.25 ml, Calendula D4 0.5 ml, Chamomilla D5 0.5 ml, Echinacea angustifolia D4 0.125 ml, Echinacea purpurea ex planta tota D4 0.125 ml, Hamamelis D3 0.05 ml, Hypericum D4 0.15 ml, Millefolium D5 0.5 ml, Symphytum D8 0.5 ml, Hepar sulphuris D6 0.5 ml, Mercurius solubilis Hahnemanni D8 0.25 ml.

Engstol ad us vet.: Each 5 ml injection ampoule contained: Vincetoxicum hirundinaria D6 0.03 ml, Vincetoxicum hirundinaria D10 0.03 ml, Vincetoxicum hirundinaria D30 0.03 ml, Cinis vincetoxici D30 0.005 ml, Sulphur D10 0.015 ml, Sulphur D4 0.015 ml.

Lachesis compositum ad us vet.: Each 5 ml injection ampoule contained: Lachesis mutus D6 0.2 ml, Pyrogenium-Nosode D6 0.2 ml, Echinacea angustifolia D1 0.1 ml, Pulsatilla pratensis D2 0.05 ml, Juniperus sabina D3 0.1 ml.