The role of prolactin in enhancement of milk somatic cell count and polymorphonuclear neutrophils after a prolonged milking interval

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Abstract

A technical failure in automatic milking systems may result in a severely prolonged milking interval (PMI) with a subsequent peak in milk somatic cell count (SCC) and polymorphonuclear neutrophils (PMN). The objective of this study was to investigate whether the increase in SCC and PMN was associated with alterations in prolactin (PRL) and cortisol concentrations that might have contributed to enhanced migration. Both factors are known to possess immunomodulatory properties. Composite milk and blood were taken from 27 cows with bacteriologically negative quarter milk, after a PMI of 24 h, during the time of the peak in SCC and milk PMN and until the cell counts had returned to baseline. No changes in cortisol or PRL in blood were observed after the PMI, nor was the level of milk cortisol altered. Milk PRL started to increase concomitantly with the observed increase in SCC and PMN, at the first milking after the PMI, but remained at a consistently higher level after the cell counts had declined, throughout the study. *In vitro*, PRL showed a significant chemotactic effect on PMN. The results indicate that cortisol was not a factor behind the SCC reaction after the PMI but it cannot be excluded that PRL might have contributed to the enhanced recruitment of PMN. The different pattern of the cell and PRL reaction might be explained by a down-regulation of PRL surface receptors on PMN, occurring after the initial enhancement of migration, attributable to that PRL concentration remain at an increased level.