Clinical evaluation of poor milking procedures effects on dairy Mediterranean buffaloes udder health

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SUMMARY
Two pluriparous [MB1: 243 days in milk (DIM); MB2: 232 DIM] and 1 primiparous (MB3: 247 DIM) Mediterranean buffaloes (MB), were submitted to clinical examination of teat and udder including CMT, sterile milk sampling for bacteriological milk culture (BMC) and somatic cells count (SCC) evaluation. Milking procedures monitoring and teat scoring of all milking MB were also performed.

MB1 showed apical teat trauma with ulceration near orifice and a moist, wet, inflamed area surrounding the teat canal; MB2 revealed vertical skin fissure originating from the teat apex and flowing into a wide moist and wet area closer to the base of the teat with signs of skin necrosis. Finally MB3 revealed severe teat canal eversion with dry keratinized protrusion, grade 4. MB1 and MB3 were score CMT +2, instead MB3 +3. BMC revealed E. coli mono-infections in MB1 and 3, with SCC of 152*10^4 and 119*10^4 respectively; milk sample of MB3 was instead sterile with 450*10^4 SCC. A hygiene score, ranged from 1 (clean) to 5 (dirty,) was also assessed for 5 body areas, with the following mean results: tail head 3.0±0.9 (score ± standard deviation), thigh (lateral aspect) 3.3±0.5, abdomen 2.7±0.5, udder 3.7±0.5, rear limbs 4.3±0.5.

According to the clinical picture and the weak point were observed during milking procedures, teat lesions due to poor milking procedures have been suspected. A correct therapy and strategies to prevent the problem in future have been suggested. All the indications given must to be included in complete and up-date udder health monitoring program, allowing to correctly monitor over-time milk yield and quality, guaranteeing to detected presence of problem as soon as possible and aiming to reduce their short-, mid- and long- term negative effects.

KEY WORDS
Mastitis, Mediterranean buffalo, milking procedures, udder health, teat health.

HISTORY AND FARM MANAGEMENT
In August 2015, a farmer experiencing cases of severe teat-lesions in his closed and deseasonalized dairy Mediterranean buffalo (MB) herd, asked for veterinary support to investigate causes and preventive strategies of the problem. The first appearance was in February 2015 and approximately 20 similar cases were observed until the investigation time; 2 of them, even lost the quarter because of a resulting stenosis of the teat-apex.

During the questioning, farmer referred of severe skin lesions at level of teat-apex of 3 late-lactation dairy MB present in farm. After milking, lesions were usually scrubbed with water and disinfected (every second day) with Oxytetracycline spray (NeoSprayCaf®, Farmaceutici Gellini, Aprilia, LT). Affected quarters were also scored by California Mastitis Test (CMT), resulting ranged between +2 and +3; clots and watery milk have been also observed. No records of problems observed during milking procedures (e.g. udder disorders) were available.

Some general informations regarding farm management have been collected. One-hundred four dairy MB (89 pluriparous and 15 primiparous) were milked in a 2x3 side open parlour with single return line, recording only animal identity and milk yield. A mean milk production/MB of ~1.700 kg milk, with ~8.1% fat and ~4.0% protein was detected. All milking MB were kept in a roofed common paddock of ~1200 m2 (~20 m×40 m) characterized by a common bedded area (with dried manure solids), a loafing area and a feeding alley with solid non-grooved concrete floor (cleaned once a day). Parlour wash-up routine was applied once a day. Milkers were hired in December 2014, without to receive a specific training for milking procedures. Monthly bulk tank milk (BTM) analysis were used for milk quality monitoring; since January 2015, somatic cell count (SCC) were constantly over 500*10^3 with a peak recorded during summer time (June: 580*10^3, July: 660*10^3, June: 602*10^3).

DIAGNOSIS AND THERAPY
The affected MB, 2 pluriparous [MB1: 243 days in milk (DIM); MB2: 232 DIM] and 1 primiparous (MB3: 247 DIM), were
submitted to clinical examination of teat and udder including CMT, sterile milk sampling for bacteriological milk culture (BMC) and SCC evaluation. Severe lesions involved one rear quarter for each animal visited (MB1 and 2; right rear; MB3: left rear). MB1 showed apical teat trauma with ulceration near orifice and a moist, wet, inflamed area surrounding the teat canal (Figure 1); MB2 revealed vertical skin fissure originating from the teat apex and flowing into a wide moist and wet area closer to the base of the teat with signs of skin necrosis (Figure 1). Swelling of the correspondent quarter and lymph-node were observed. Finally MB3 revealed severe teat canal erosion with dry keratinized protrusion, grade 4. All the affected teats were hard and the two with lesions slightly oedematous. Teat-end eversion with less severe hyperkeratosis (ranged between +2 and +3) have been detected in the rest of the quarters.

MB1 and MB3 were score CMT +2, instead MB3 +3. BMC revealed *E. coli* mono-infections in MB1 and 3, with SCC of 152*10^4 and 119*10^4 respectively; milk sample of MB3 was instead sterile with 450*10^4 SCC. A hygiene score, ranged between 1 (clean) to 5 (dirty,) was also assessed for 5 body areas1, with the following mean results: tail head 3.0±0.9 (score ± standard deviation), thigh (lateral aspect) 3.3±0.5, abdomen 2.7±0.5, udder 3.7±0.5, rear limbs 4.3±0.5.

Milking procedures monitoring and teat scoring of all milkings MB were also performed2. Several weak point were observed: milkers did not use a precise working plan, udders were routinely washed with water and dried with one towel instead sterile with 450*10^4 SCC. A hygiene score, ranged between 1 (clean) to 5 (dirty,) was also assessed for 5 body areas1, with the following mean results: tail head 3.0±0.9 (score ± standard deviation), thigh (lateral aspect) 3.3±0.5, abdomen 2.7±0.5, udder 3.7±0.5, rear limbs 4.3±0.5.

DISCUSSION AND CONCLUSION

Although MB milk production represents one of the most important Italian rural economies3, buffalo herd management is affected by poor specific scientific knowledge6-7. MBs have been considered for a long time less susceptible to the effects of poor milking procedures and mastitis8. In recent years, the severe genetic selection with the goal to improve milk yields as well as the continuous tendency to associate it with cows (under management point of view) is predisposing the animals to the same pathologies7,9. The clinical picture observed can be indeed considered as common consequence of poor milking procedures in dairy cows10, but no similar reports are instead present in literature for MB. Hyperkeratosis is a normal physiological response to the forces applied to the teat skin during milking, either by a milking machine, a hand-milk or a calf. As demonstrated,

### Table 1 - Results of the teat score performed in all the milking buffaloes present in farm.

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Teats</th>
<th>Front teats</th>
<th>Rear teats</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (normal)</td>
<td>167/416 (~40%)</td>
<td>97/167 (~58%)</td>
<td>70/167 (~42%)</td>
</tr>
<tr>
<td>2 (slightly rough)</td>
<td>114/416 (~27%)</td>
<td>52/114 (~46%)</td>
<td>62/114 (~54%)</td>
</tr>
<tr>
<td>3 (rough)</td>
<td>83/416 (~20%)</td>
<td>32/83 (~38%)</td>
<td>51/83 (~62%)</td>
</tr>
<tr>
<td>4 (very rough)</td>
<td>43/416 (~11%)</td>
<td>20/43 (~47%)</td>
<td>23/43 (~53%)</td>
</tr>
<tr>
<td>Trauma or lesions</td>
<td>9/416 (~2%)</td>
<td>3/9 (~33%)</td>
<td>6/9 (~67%)</td>
</tr>
</tbody>
</table>
the onset and severity of hyperkeratosis may be profoundly influenced by environmental conditions and milking management also in MB. As reported in literature for cows, more than 5% of cows having teat open lesions (including chaps or cracks) or more than 20% of cows having one or more teats scored +3 or +4, as well as more than 10% are scored +4 can be considered main med- and longer-term effects of poor milking routine and justify further investigations. Detection of short and incorrect prep-lag phase, overmilking, and excessive vacuum were indeed observed and most likely associated with severe consequence on teat and udder health also in MB. Maintenance of healthy teat skin and teat-ends, associated to good hygiene standard at environmental (barn and parlour) and animal level, are key part of any effective preventive program; indeed changes to teat tissue, particularly the skin of the barrel, teat-end and teat canal, can alter the risk of new mastitis infections, sub-clinical or clinical mastitis. Although no previous informations are available regarding the situation of the herd, the present condition could be one of the possible explanations for the continuous high level of SCC referred by the farmer since the appearance of the first problem. It was widely demonstrated as in-udder bacterial invasions are facilitate in animals with high teat-score, even worse if these subjects present poor hygiene condition; lesions after traumas (e.g., over-milking, excessive vacuum fluctuation) may lead to damage of the teat orifice and secondary bacterial infections. For this reason, it was also recommended to improve the environmental hygiene and reduce use of water.

A correct preparation of MB’s udder have to considered some peculiarities of the specie: cisternae area is smaller (22 cm²), with a lower restraining milk quantity (5% vs. 20% in the cow), a collapsed lumen post-milking and the largest milk fraction stored in the secretory tissue (95%) 4. The small volume of the cistern suggests that a longer teat stimulation before teat cup attachment is necessary to guarantee a correct oxytocin emission. The lag-phase requires more time compared to cows, lasting up to 2 minutes. Although higher values of mechanica vacuum are required for successful milking 12, a careful udder preparation is an essential precondition for successful buffalo milk let down, reducing timing of the oxytocin release and negative vacuum’s effects. As explained to the farmer, all the indications given must to be included in complete and up-date udder health monitoring program, allowing to correctly monitor over-time milk yield and quality, guaranteeing to detected presence of problems as soon as possible and aiming to reduce their short-, mid- and long-term negative effects.

References