In the context of acute as well as chronic wounds, bacteria are a common problem, but also a major challenge with regard to the treatment of the wound. In order to meet this challenge, it is first of all important to determine the specific clinical manifestation of the bacteria present in a wound.

**Systemic infections**
When high bacterial counts occur in conjunction with redness, swelling, excessive heat, and oedema in a wound, and when these clinical signs are accompanied by elevated leukocyte counts and an increase in acute phase proteins, this is called a systemic infection. Systemic infections have to be treated with systemic antibiotics. Much more common, however, is a colonisation with bacteria that affects only the wound itself.

**Contamination and colonisation**
The situation is almost always that of a contamination in which minimum amounts of bacteria, which are not proliferating, have no clinical significance. In fact, some authors contend that such low bacterial loads may even promote wound healing. In microbiology, the term “colonisation” is used for greater numbers of bacteria which actually proliferate. But again, there is no reaction from the tissue.

**Critical colonisation**
A situation which involves an increased risk of infection and thus requires urgent treatment is a critical colonisation, with bacterial counts of ++ positivity and more, in which the patient also experiences additional symptoms. In addition to the impairment of wound healing caused by the critical colonisation, there is also an increase in exudation, a greater amount of pain, and bright red, fragile granulation tissue in the wound area. It must be noted that in this particular situation, which some authors call a local infection of the wound, the use of systemic antibiotics is contraindicated.

In one study we conducted here at the LKH Feldkirch, we took a closer look at the characteristics of such locally infected wounds. In 19 ulcers studied, we found virtually all origins known to date. The vast majority of locally infected wounds had microbial loads of +++ positivity, with either one, two, or three pathogens detected in one-third of all cases each. As could be expected, the primary species involved were staphylococci and streptococci. Interestingly, we observed that during local treatment of a particular pathogen, the numbers of another pathogen would gradually increase. This change in the spectrum of pathogens typically occurred over a period of 3-5 days, until we succeeded in reducing the microbial load to a harmless level.

**Local antimicrobial therapy**
So, what options do we have for local antimicrobial therapy in acute and chronic wounds? Primarily, all antiseptics approved in the OGHMP list for Austria can be used. As there is no specification for particular pathogens with antiseptics, a special ZfW consensus committee published a position paper on the selection of wound antiseptics in 2004.

**Use of antiseptics**
In this paper, povidone-iodine and octenidine were given priority for purposes of short-term therapy, while polihexanide and taurolidine were recommended for repeated application. The use of ointments that contain antibiotics in the treatment of wounds is the subject of controversial debate. Overall, however, most experts think that ointments containing antibiotics should not be used in chronic wounds.

**MRSA**
They all agree that in case of MRSA both topical Fucidin and topical Mupirocin are contraindicated. Studies have shown that that topical PVP-iodine as well as medicinal honey can be used in addition to other treatments.
Wound dressing

As for wound dressings, there are two groups with antimicrobial effects currently on the market. On the one hand, we have the very large group of silver products; on the other there is the relatively new Suprasorb® X with polihexanide (PHMB). Besides, there are also a variety of other antimicrobial treatments for wounds, such as ultrasound, shock wave therapy, hydrosurgery, hyperthermia, or the treatment with maggots or bacteriophages. All of these, however, are still at a fledgling stage of development, with little evidence published to date.

When we take a closer look at the antimicrobial wound dressings of Modern Moist Wound Management, we have a large group of dressing materials with silver, while there is only one type of dressing that contains the active substance PHMB. In the group of silver dressings, we find a variety of different dressing materials, such as alginate, hydrofibres, aquafibres, or hydrocolloids, with each kind releasing different amounts of silver. The highest release rates are found in Acticoat® and in the alginate dressing Suprasorb® A with silver. The other concept is represented by the cellulose dressing, which releases its active substance PHMB into the wound at the same rate and in a stable form, and also claims to have a moisture-controlling effect.

Management of local infected wounds

In the clinical management of patients with locally infected wounds, the important question to be asked is how to use the antimicrobial therapy options which are available. In order to accomplish a successful therapy, specific therapy objectives have to be defined beforehand.

With locally infected wounds, these objectives include
- reduction of the microbial load (it is not mandatory to achieve a complete absence of pathogens),
- prevention of complications, in particular systemic infection and sepsis,
- successful exudate management, resulting in an effective reduction of the large amounts of exudate present in the wound, and
- pain reduction.

As a general rule, the primary objective for any successful antimicrobial treatment of wounds is to overcome the situation of stagnation and get the wound healing process going again.

In the specific situation of a high microbial load of ++ positive or more, with typical local signs of excessive heating and redness of the oedema, and laboratory parameters indicating a systemic infection, such as increased settling, we have an indication for the use of systemic antibiotics in accordance with the susceptibility profile of the specific pathogen(s) involved. In addition, the wound should be cleaned with antiseptics and covered with wound dressings as appropriate for the current stage of the wound. A different approach should be used in case of high microbial loads without systemic signs of infection.

As we have explained above, antiseptic agents, topical agents, or antimicrobial wound dressings may be used for this purpose. Moreover, the patient may also require pain therapy in accordance with the WHO regimen.

Silver or PHMB?

When antimicrobial dressings are used, treatment should follow the same general rules and principles that apply to the use of systemic antibiotics – i.e., the total period of treatment should not exceed 14 - 21 days, and dressings should be changed at intervals of 1 - 3 days.

It is also important to closely monitor the bacteriological situation in the wound by means of swabs taken at least every 3rd day. As for the general question whether to use Suprasorb® X + PHMB or one of the silver-containing products, there are no conclusive data available either with regard to a comparison between the individual silver products as such or for a direct comparison between the two different antimicrobial therapy options. Overall, however, there are some general rules for the use of silver products as well as for Suprasorb® X + PHMB. While silver products with high silver release rates should be used in the therapy of local infection of heavily exudating wounds, the cellulose dressing with PHMB is not appropriate for this type of wounds.

Conclusions

In summary, it must be noted that a systematic, clearly structured approach to treatment is just as important in the case of critically colonised or locally infected wounds as it is in the therapy of systemic infections. This means that there is an urgent need for multicentre comparison trials to provide evidence that will help to develop standardised guidelines for local infection management in the treatment of wounds. In particular, such trials should focus on clinical situations that put massive limitations on the use of systemic antibiotics due to vascular conditions such as Diabetic Foot or Peripheral Arterial Occlusive Disease (PAOD).