

HTA-Report | Summary

Medical and health economic evaluation of prevention- and control measures related to MRSA infections or -colonisations at hospitals

Korczak D, Schöffmann C

Health political background

Methicillin-resistant Staphylococcus aureus (MRSA) are dangerous agents of nosocomial infections.

In Europe the prevalence of MRSA is very different. In Germany the prevalence of MRSA is 20.3 % in 2007 (Oxacilline-resistance according to EUCAST-criteria [EUCAST = European Committee on Antimicrobial Susceptibility Testing]). There is a need for more preventive activities due to the increasing distribution of MRSA in German hospitals. As a result of a "search and destroy" policy the MRSA prevalence of all Staphylococcus aureus isolates is considerably lower in the Netherlands and Scandinavia.

The cost-efficacy of preventive and control measurements is of high relevance for health politics.

Scientific background

MRSA strains are resistant against all available beta-lactam-antibiotics. The therapy possibilities for patients are drastically reduced.

MRSA strains can provoke an endogenous or exogenous infection. The transmission occurs mainly by the hands of the medical and nurse staff. If there is a nasal colonisation the agent can spread from the vestibulum nasi to other areas of skin and mucosa.

Medical research questions

1. Which measurements are effective in the prevention and control of MRSA infections in the hospital?
2. How effective are contact precautions?
3. How effective is screening?
4. How effective is decolonisation?
5. How effective is education and training?
6. Which relevance has surveillance?

Economic research questions

1. How economically effective are different prevention and control measurements?
2. Which recommendations can be given to health care politics on the basis of cost-effectiveness studies?

German Agency for HTA
at DIMDI (DAHTA)
Waisenhausgasse 36-38a
50676 Köln
Germany

Tel.: +49 221 4724-525
Fax: +49 221 4724-444
dahta@dimdi.de
www.dimdi.de

All HTA reports are available for free of charge as full texts in the DAHTA database (only in German) and at German Medical Science (GMS).

Within the scope of the



Bundesministerium
für Gesundheit

Ethical and juridical research questions

1. Is there stigmatization of MRSA colonised or infected patients and staff members?
2. If there is stigmatization, how can it be prohibited or revised?
3. Are there any disadvantages for patients due to the MRSA diagnosis?
4. What kind of liability problems exist if a patient or personal is infected by a MRSA positive patient?

Methods

Several key words have been defined and a research strategy has been developed. On behalf of the German Institute for Medical Documentation and Information (DIMDI), Art & Data Communication conducts an electronic search in March 2009. The following data bases are included:

BIOSIS Preview, Bundesanzeiger, Ressort BMG, CAB Abstracts, CCMed, Cochrane Library-CDSR, Cochrane Library-Central, DAHTA-Datenbank, Deutsches Ärzteblatt, Derwent Drug File, DIQ-Literatur, EMBASE, EMBASE Alert, ETHMED, GLOBAL Health, gms, gms Meetings, HECLINET, Hogrefe-Verlagsdatenbank und Volltexte, IPA, ISTEPB + ISTEP/ISSHP, KARGER-Verlagsdatenbank, Kluwer-Verlagsdatenbank, MEDIKAT, MEDLINE, NHS Economic Evaluation Database, NHS-CDR-DARE, NHS-CDR-HTA, SciSearch, SOMED, Springer-Verlagsdatenbank, Springer-Verlagsdatenbank PrePrint, Thieme-Verlagsdatenbank, Thieme-Verlagsdatenbank PrePrint.

The time frame reaches from 2004 until 2009, including German and English literature. There are four single searches for medical, health economical, juridical and ethical themes in the hospital setting and in the health care system in general. Additionally the authors are looking for related studies and literature.

The methodological quality of the studies is evaluated by check lists of the German Scientific Working Group Technology Assessment for Health Care (GSWG HTA).

Medical results

33 studies of 1,508 hits fulfil the medical criteria for inclusion. Altogether the quality of the studies is rather limited.

The preventive and control measurements are classified in screening, contact precautions, decolonisation, education and training and surveillance measurements.

The key question which measurements are effective in prevention and control of MRSA infections is hard to answer because of the limited quality of most of the studies. The results indicate however that several individual measurements are effective. Part of these are: the conduction of differentiated screening under regard of the particular endemic situation, education and training concerning the improvement of the compliance of hand hygiene, differentiated decolonisation using Mucpirocin (in combination with other drugs), the application of antibiotic control measurements and the introduction and control of hygienic measurements. A multimodal approach leads to an impressive reduction of nosocomial infections which is consisting of routine screening, active surveillance, decolonisation, extended hygienic measurements and staff training.

Economic results

From the 829 economic publications, eight studies are selected. The eight studies are of limited quality. Furthermore, the studies cover seven different countries with different health care systems and cost structures. The comparison of the study results is therefore additionally limited. The break even point of cost-effective prevention and control measurements cannot be finally clarified. There is a need for additional cost-benefit analyses. The very small number of cost-efficacy studies in Germany covers only partial aspects. They cannot be regarded as representative for the use of prevention and control strategies.

Ethical and juridical results

Three studies are identified which deal with ethical and social aspects of MRSA.

The study results show that isolation of MRSA patients correlates with fewer contacts with the medical staff, more care failures, lower satisfaction with care and higher rates of depression and anxiety. These results should be taken into account to act against the risk of stigmatization.

In general, liability of hospitals is oriented at the guidelines of the infection protection law and the hospital regulations in Germany. But there exist legal uncertainties and necessities for regulation concerning individual cases of patients, medical staff and risk management.

Discussion

The studies show that different preventive and control measurements are effective in the reduction of MRSA colonisations and infections. But the majority of the studies does not consider confounders appropriately (e. g. age, sex, social strata, hospital department, duration of isolation, use of antibiotics, compliance of hand hygiene/contact precaution, colonisation pressure, size of staff). The internal and external validity of the studies is too weak to be sure about the efficacy of single interventions. Hygienic measurements prove to be effective. But it cannot be defined in detail which of the hygienic measurements (e. g. gloves, washing hands, wearing gowns or masks) has the significantly highest effect on the reduction of MRSA. It is irritating that there are high differences in the compliance concerning hand hygiene between different studies. A general decolonisation is questionable for different reasons: first because of the side-effects for patients, second because of the high rate of spontaneous remissions in the untreated control group, third because of the differentiated process from colonisation to infection. Severalfold Hawthorne effects have been reported. One of them is that the competition between hospitals to reduce MRSA-rates leads already to a reduction.

Conclusions

It is evident that selective screening programs of risk patients considering the particular MRSA-prevalence are of use. The application of rapid tests seems to be only recommendable for risk patients and a high MRSA-prevalence. The improvement of the compliance of hand hygiene should be the basis of any prevention strategy. Training of staff members (with feed

back mechanisms) is effective to improve compliance and to optimise the use of antibiotics. Antibiotic management programs are effective as well. For the realisation of the measurements a sufficient number of hospital hygienists and hygienic staff members is needed.

Obviously multimodal approaches can lead to overadditive effects. Therefore the catalogue of preventive and control measurements has to be further evaluated. Good cost-efficacy studies are missing in Germany. The psychosocial effects of MRSA-infections are not researched in Germany. There is only punctual information on the risk management of hospitals.