of vascular graft infections, a variety of anti-infectives bound to graft materials have been studied in vitro and under experimental in vivo conditions. Of these, gelatin-sealed Dacron grafts containing bound rifampin appear to have the most favorable pharmacokinetics in vitro. Experimental models demonstrate efficacy for the prevention of infection following contamination of the graft either directly or hematogenously, as well as efficacy for the treatment of established infection when rifampin-containing grafts are used as part of surgical therapy. To date, however, results reported from two randomized clinical trials involving over 3100 patients have not shown a statistically significant reduction in graft infections.

Both the incidence of endocarditis and the mortality among patients with endocarditis are higher among patients with cardiac prosthetic valves than among patients with native cardiac valves. Endocarditis affecting prosthetic cardiac valves typically originates in the sewing ring. Recently, St Jude prosthetic cardiac valves using Dacron sewing rings impregnated with silver (Silzone) have been introduced into clinical practice. In vitro, Silzone inhibits attachment and growth of microorganisms. A large, international randomized clinical trial designed to determine whether Silzone is effective in reducing the incidence of prosthetic valve endocarditis is in progress.

Current aspects in anaerobic infections

S168 Antimicrobial resistance in anaerobic bacteria

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Human pathogenic anaerobic bacteria were susceptible until a few years ago to antimicrobial agents used in prophylaxis and treatment of anaerobic infections. However, during recent years resistance to different antibiotics has been reported more frequently from different parts of the world. The Etest method (more reliable than the disk diffusion method) has become available for routine laboratories to evaluate the resistance of clinical isolates to most widely used antibiotics. Antibiotic resistance due to beta-lactamase activity is observed most frequently among Bacteroides fragilis group strains, however, more and more Prevotella, Porphyromonas and Fusobacterium strains have been reported to be resistant to different antimicrobial agents. The metallo-beta-lactamase production of B. fragilis is responsible for the resistance to carbapenems. The presence of the bla gene, coding for this enzyme, has been detected by PCR among carbapenem-resistant strains in different parts of Europe. Decreased permeability and modification of the PBPs has also been reported as the cause of resistance to cefoxitin, ureidopenicillins and inhibitor combinations. Clindamycin resistance among clinically important anaerobes varies in different parts of the world. Among Gram-negative anaerobes, a low number of strains resistant to metronidazole have also been detected in different countries. According to the in vitro data, the newest fluoroquinolones, such as trovafloxacin, clinafloxacin and grepafloxacin, have considerable anti-anaerobic activity.

Medical versus surgical therapy in native and prosthetic valve endocarditis

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Infective endocarditis (IE) of native and prosthetic heart valves is still burdened by a high mortality. While cumulative survival in uncomplicated IE is 0.93 ± 0.05, manifestation of any of the typical complications (e.g. congestive heart failure, thromboembolism, persistent sepsis, acute renal failure), vegetation size 10 mm, culture-negative endocarditis and a delay in diagnostic decision-making has a significant negative prognostic influence. Early surgical intervention has significantly contributed to the overall prognostic improvement during the last two decades. Evidence-based experience with more than 600 consecutive patients with acute IE has been used to establish criteria to determine which patients may benefit from urgent surgical intervention: acute aortic regurgitation with lung edema not compensated medically within 24 h; acute mitral regurgitation with lung edema not compensated by PEEP; ventilation and modulation of the left ventricular impedance by sufficient afterload reduction; thromboembolic complications (TE) within 30 days after manifestation of IE, if residual vegetations are demonstrated post-TE; recurrent thromboembolic episodes; vegetations larger than 10 mm in mitral IE; demonstration of secondary mitral valve involvement in aortic IE; sepsis persisting for more than 48 h despite antimicrobial therapy; acute renal failure of any etiology; large vegetation size (VS) and a high minimal bactericidal concentration (MBC). Medical cure rates are low and the risk of complications is high if VS is 10 mm and MBC is 1 mg/L.

Current aspects of anaerobic infections

S169 Current aspects of anaerobic infections

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The normal human microflora contains both aerobic and anaerobic bacteria. The human gastric mucosa is colonized by the indigenous bacteria in low numbers in healthy persons due to the low pH of the stomach. The bacteria are also protected from the gastric acid by the mucosal layer in the stomach. Impaired gastric secretion decreases the pH constantly over 4, proliferation of acid-tolerant streptococci and lactobacilli. When the pH is constantly over 4, proliferation of other anaerobic bacteria such as bacteroides and fusobacteria can occur. These bacteria colonize the mucosa without any signs of mucosal inflammation, in contrast to Helicobacter pylori. It is now accepted that the finding of Helicobacter pylori is associated with gastritis and peptic ulcer disease. Treatments for Helicobacter pylori infections include proton pump inhibitors in combination with antimicrobial agents with different clinical responses. Probiotics containing anaerobic bacteria have also been reported to be successful in the treatment of these infections. In patients treated with a proton pump inhibitor, anaerobic bacteria such as veillonellae, bacteroides and fusobacteria are increased when Helicobacter pylori is significantly decreased. Patients receiving a proton pump inhibitor together with antimicrobial agents have increased numbers of anaerobic bacteria when Helicobacter pylori is eradicated from the gastric microflora. Thus, there is an inverse relationship between the anaerobic microflora and Helicobacter pylori during proton pump inhibitor/antimicrobial treatment.
**S170 Clostridium difficile Infection in Europe**

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The recorded incidence of Clostridium difficile-associated diarrhea (CDAD) continues to increase in most European countries, but surveillance data are inconsistent and incomplete. Of nine countries represented in the European C. difficile Study Group, only five have data on the extent of CDAD and four have national case totals—Scotland c. 1000, Finland c. 4000, Sweden c. 8000, and England and Wales c. 15,500. The numbers reported in England and Wales have increased exponentially during the 1990s. Typing for epidemiologic purposes is performed in Scotland, Germany, France, Sweden and England and Wales by methods that include serotyping, protein banding (PAGE), PFGE, AP-PCR, RFLP and PCR-ribotyping. As many diagnoses are made by toxin detection, the availability of isolates for typing is limited. Both single-strain outbreaks with cross-infection and multi-strain clusters related to broad-spectrum antibiotic usage occur. The PHLS Unit has established a library of 100 C. difficile ribotypes; type 1 is widespread among UK hospitals and may represent a clone with enhanced survival or virulence characters. The ecology of C. difficile requires study. Healthy carriage appears to be low in European adults but C. difficile has been isolated from animals, soil and water.

**Use of indicators for good infection control practice**

**S171 Which indicators can be useful for the judgment of antibiotic strategies for antibiotic prophylaxis?**


Present knowledge of the pros and cons of antibiotic prophylaxis calls for a restrictive policy, applying validated antibiotic prophylaxis to patients only where adequate documentation for the expected effect exists. The current literature, however, shows varying strategies for the use of prophylactic antibiotics to prevent postoperative wound infections in surgical patients and pneumonitis in intensive care patients, though sufficient scientific verification already exists for a range of well-defined clinical situations allowing discrimination between appropriate and inappropriate practice. Within the field of infection control, the use of clinical monitoring systems has advanced to a point where unvalidated applications should be avoided, and the time has come where the focus should be on developing relevant indicators for easy monitoring.

The ESAP (European Strategy for Antibiotic Prophylaxis) project applies the essence of this experience to examine antibiotic prophylaxis in a sample of surgical and intensive care patients, and includes validation techniques to ensure comparability of data. A guideline with examples of good antibiotic prophylaxis (GAP), as well as indicators for verification of GAP, are expected to emerge from this project. Structural indicators referring to department policy, staff training and education, as well as process indicators of timing and duration of prophylactic treatment, have been found useful in the project's pilot study and are currently being tested in a larger scale study.

Present status and perspectives of the project will be discussed.

**S172 Experience with indicators of infection control (IC) problems in the course of a multicenter quality assurance project (NIDEP 2)**

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**Objectives:** To evaluate indicators of IC problems.

**Methods:** A prospective controlled intervention study was performed in the surgical and intensive care units of eight medium-sized general hospitals. Data on the structure and process quality were recorded at the beginning and the end of the study, as well as nosocomial infection (NI) rates, according to the CDC definitions (incidence studies over periods of 8 weeks). Four hospitals with a special interest in IC activities were chosen for intervention, the remaining four serving as control hospitals. Four physicians trained in IC, one in each hospital, analyzed the situation through observation and questionnaires, and aimed at optimizing the IC procedures over a period of 2 years, in particular by increasing teaching activities. Finally, the incidence density rates for NI at the end of the study were compared with the rates at the beginning and together analyzed with the data for a number of recommended indicators of IC problems.

**Results and conclusion:** A total of 76,811 patient days was registered at the beginning and the end of the study; the overall incidence density of NI was 7.5% in the first period and 6.1% at the end. A prevented fraction of 25.4% NI (CI 95: 6.1–40.7) was found in the four intervention hospitals; the prevented fraction in the four control hospitals was 10.0% (CI 95: 15.8–30.1). This reduction of NI was not correlated with a corresponding development of the majority of indicators of IC problems. Thus it remains difficult to recommend simple and reliable indicators of IC problems.

**S173 Results of repeated prevalence surveys: indicator of good practice?**

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Prevalence surveys are of great practical and scientific interest with regard to the evolution of a variable whenever the results of multiple, periodically repeated studies are available. The EPINE study (Prevalence Survey of Nosocomial Infections in Spain) has been conducted every year since 1990 in Spanish hospitals, including a 'core' sample of 64 hospitals. This situation allows the analysis of several features of the EPINE study related to the use of prevalence surveys as quality or performance indicators for infection control.

The EPINE provides hospitals with a measure of nosocomial infection rates. Although it is an imperfect and limited measure, alternative options for most institutions are either complete ignorance or comparisons of historical data within a single institution. Again, methodological shortcomings are lurking everywhere, but repeated prevalence studies are a valuable and useful source of information.