

Wound Infection News

First European case of vancomycin-resistant *Staphylococcus aureus*

The authors report the isolation and characterisation of the first reported European case of vancomycin-resistant *S. aureus* (VRSA). This strain was isolated from a 74-year old female patient in Portugal with diabetes mellitus, chronic renal failure and peripheral vascular disease. The authors comment that cases of VRSA are rare, and have thus far been mostly reported in the US. They highlight the location of Portugal for this strain as a particular cause for concern, as the country has a high rate of MRSA, and of vancomycin resistance in other bacterial strains.

Melo-Cristino J, *et al.* **First case of infection with vancomycin-resistant *Staphylococcus aureus* in Europe.** *Lancet.* 2013 Jul 20;382:205.

[http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(13\)61219-2/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(13)61219-2/fulltext)

Different disease processes may be responsible for superficial and deep organ/space surgical site infections

The aim of this retrospective cohort study was to identify risk factors predictive of both superficial and deep organ/space surgical site infections (SSIs) as part of the American College of Surgeons National Surgical Quality Improvement Program. In total, 27,011 patients from 205 hospitals undergoing colectomy procedures were included. Open surgery (as opposed to laparoscopic), and status as a current smoker were identified as risk factors common to both types of SSI. Specific postoperative diagnoses, disseminated cancer, and irradiation therapy, however, were associated with increased odds of deep/organ-space SSI only, while the relationship between SSI incidence and increasing BMI was associated more strongly with superficial SSI. The authors conclude that risk factor magnitude and significance vary for superficial and deep organ/space SSI, which may suggest that they are different disease processes. They further suggest that these SSI types may be best considered separately for root-cause analyses and best-practice/intervention development.

Lawson EH, *et al.* **Risk factors for superficial vs deep/organ-space surgical site infections: implications for quality improvement initiatives.** *JAMA Surg.* 2013 Jul 17. [Epub ahead of print]

<http://archsurg.jamanetwork.com/article.aspx?articleid=1714658>

Relationship between timing of antibiotic administration and infection risk

Two studies published in July reviewed the relationship between timing of prophylactic antibiotic administration prior to surgical procedures, and incidence of postoperative infection.

Koch *et al.* studied postoperative infections in 4,453 patients undergoing general surgery procedures over a period between January 2006 and June 2012. The association between antibiotic timing and infection was studied using semi-parametric logistic regression; end-point was a composite of wound disruption, superficial, deep, organ space and SSIs, and sepsis. The authors report a non-linear relationship between surgical incision and infection and antibiotic administration, with the lowest risk observed with antibiotic administration 4 minutes prior to incision. Their model suggested that targeting initial antibiotic administration closer to incision could result in a reduction in primary infection of up to 11.3%.

A retrospective cohort study performed by Hawn *et al.* reviewed National Veterans Affairs Surgical Care Improvement Project data from 112 Veterans Affairs hospitals and matched Veterans Affairs Surgical Quality Improvement Program data in 32,439 operations. Prophylactic antibiotics were administered at a median of 28 minutes before surgical incision; SSI developed in 4.6% of cases. Higher SSI rates were

observed for procedures where antibiotics were administered more than 60 minutes prior to incision, and the authors report a significant nonlinear relationship between prophylactic antibiotic timing and SSI when timing was considered as a continuous variable ($p=0.01$). No significant association was observed, however, in generalized additive models adjusted for patient, procedure, and antibiotic variables. In orthopaedic procedures, vancomycin hydrochloride was associated with higher SSI occurrence, while in colorectal procedures cefazolin sodium and quinolone in combination with an anaerobic agent were associated with fewer SSI events. The authors concluded that SSI risk varies dependent on patient and prophylactic factors, and on antibiotic properties, but is not significantly associated with timing of antibiotic administration.

Koch CG, *et al.* **Is it time to refine? An exploration and simulation of optimal antibiotic timing in general surgery.** *J Am Coll Surg.* 2013 Jul 10. [Epub ahead of print]

<http://www.ncbi.nlm.nih.gov/pubmed/23849901>

Hawn MT, *et al.* **Timing of surgical antibiotic prophylaxis and the risk of surgical site infection.** *JAMA Surg.* 2013;148(7):649–57.

<http://www.ncbi.nlm.nih.gov/pubmed/23552769>

<http://archsurg.jamanetwork.com/article.aspx?articleid=1669977>

New publications in Wound Infection – July 2013

Evgeniou E, *et al.* **The management of animal bites in the United Kingdom.** *Eplasty.* 2013;13:e27.

This literature review on animal bite management showed that antibiotics are used prophylactically in 98% of plastic surgery units, and suggests that appropriate wound management is the most important factor for preventing infection in this wound type. The authors present a guideline for the management of animal bites based on the existing literature, and recommend that antibiotic prophylaxis should only be given in high-risk wounds, with primary closure performed in low-risk wounds.

<http://www.ncbi.nlm.nih.gov/pubmed/23837110>

Paryavi E, *et al.* **Predictive model for surgical site infection risk after surgery for high-energy lower-extremity fractures: development of the risk of infection in orthopedic trauma surgery score.** *J Trauma Acute Care Surg.* 2013;74:1521–7.

The authors analysed the efficacy of the National Nosocomial Infections Surveillance (NNIS) System and the Study on the Efficacy of Nosocomial Infection Control (SENIC) scores in predicting the risk of SSI after orthopaedic fracture surgery. They concluded that the NNIS system and SENIC scores were not useful in predicting infection risk following fracture fixation, and propose a new score incorporating fracture classification, American Society of Anesthesiologists classification, and BMI.

<http://www.ncbi.nlm.nih.gov/pubmed/23694882>

Li GQ, *et al.* **Epidemiology and outcomes of surgical site infections following orthopedic surgery.** *Am J Infect Control.* 2013 Jul 25. [Epub ahead of print]

This retrospective review evaluated the efficacy of antibiotic prophylaxis, and risk factors for SSIs in a cohort of 2,061 patients in a Chinese teaching hospital. The authors found that diabetes, smoking, surgery duration >3 hours, previous operations, or absence of antibiotic prophylaxis, were risk factors for development of SSIs in this patient group.

<http://www.ncbi.nlm.nih.gov/pubmed/23890741>

Donker JM, *et al.* **The registration of surgical site infections: a comparison of two different methods in vascular surgery.** *Surg Infect (Larchmt)*. 2013 Jul 16. [Epub ahead of print]

The authors compared surveillance of SSIs from both the surgical database and the microbiology and infection-prevention database in a single hospital. They found that sensitivity for SSIs was 57% in the surgical database, and 93% in the microbiology and infection-prevention database. The authors conclude that less-reliable scores for SSI were provided by physicians than by trained infection-control practitioners.

<http://www.ncbi.nlm.nih.gov/pubmed/23859678>

Vingsbo Lundberg C, Frimodt-Møller N. **Efficacy of topical and systemic antibiotic treatment of meticillin-resistant *Staphylococcus aureus* in a murine superficial skin wound infection model.** *Int J Antimicrob Agents*. 2013 Jul 6. [Epub ahead of print]

Topical treatment with retapamulin and mupirocin was found to be significantly more effective in reducing MRSA bacterial load in a mouse skin wound model than systemic treatment with linezolid and vancomycin. The authors conclude that topical treatment with retapamulin and mupirocin may be a suitable alternative to treatment with fusidic acid in this wound type.

<http://www.ncbi.nlm.nih.gov/pubmed/23837927>

White RW, *et al.* **Antimicrobial regime for cardiac surgery: the safety and effectiveness of short-course flucloxacillin (or teicoplanin) and gentamicin-based prophylaxis.** *J Card Surg*. 2013 Jul 9. [Epub ahead of print]

Switching from prophylaxis with multidose cephalosporin to short-course flucloxacillin (or teicoplanin) and gentamicin in patients undergoing cardiac surgery led to significantly fewer *Clostridium difficile* SSIs, with no associated increase in renal complications or change in wound infection incidence.

<http://www.ncbi.nlm.nih.gov/pubmed/23837413>

Brubaker AL, Kovacs EJ. **G-CSF enhances resolution of *Staphylococcus aureus* wound infection in an age-dependent manner.** *Shock*. 2013 Jul 12. [Epub ahead of print]

The authors found that treatment with granulocyte-colony stimulating factor (G-CSF), improved neutrophil wound accumulation in an aged mice wound model, compared with no G-CSF-induced change in young mice. They concluded that bacterial clearance and wound closure was improved by G-CSF in an age-dependent manner.

<http://www.ncbi.nlm.nih.gov/pubmed/23856924>

Justinger C, *et al.* **Surgical-site infection after abdominal wall closure with triclosan-impregnated polydioxanone sutures: Results of a randomized clinical pathway facilitated trial (NCT00998907).** *Surgery*. 2013 Jul 13. [Epub ahead of print]

The authors reported that use of a triclosan-impregnated polydioxanone loop suture for closure resulted in a significant decrease ($p < 0.05$) in wound infections in patients undergoing abdominal surgery, compared with those in which a non-impregnated polydioxanone loop suture was used.

<http://www.ncbi.nlm.nih.gov/pubmed/23859304>

Siegel HJ, *et al.* **Silver negative pressure dressing with vacuum-assisted closure of massive pelvic and extremity wounds.** *Clin Orthop Relat Res*. 2013 Jun 29. [Epub ahead of print]

Use of vacuum-assisted closure (VAC) plus a silver dressing was found to significantly reduce hospital length of stay ($p < 0.041$), treatment length ($p < 0.022$), and

number of operative debridements ($p < 0.001$) compared with VAC alone in this group of patients with massive wounds of the pelvis and extremities.

<http://www.ncbi.nlm.nih.gov/pubmed/23813240>

Cirioni O, *et al.* **IB-367 pre-treatment improves the *in vivo* efficacy of teicoplanin and daptomycin in an animal model of wounds infected with methicillin-resistant *Staphylococcus aureus*.** *J Med Microbiol.* 2013 Jun 27. [Epub ahead of print]

Pre-treatment with the antimicrobial peptide IB-367 followed by treatment with daptomycin or teicoplanin showed a -4-log bacterial culture decrease in a mouse wound infection model, compared with a -2-log bacterial culture decrease in animals treated with antibiotics alone. The combination of IB-367 and daptomycin showed the highest efficacy.

<http://www.ncbi.nlm.nih.gov/pubmed/23813277>