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Antibiotic Prophylaxis in Plastic Surgery

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ABSTRACT

Background: prophylactic antibiotics are effective in preventing surgical-wound infections. However, the clarity about the compelling need for antibiotic administration and the risk associated with their use is missing. The use of antimicrobial prophylaxis against surgical site infection (SSI) is common in plastic surgery, while results from prospective randomized controlled trials are scarce.

Aim of the Study: was to evaluate the need for antibiotic prophylaxis in the field of plastic surgery.

Methods: Electronic search of available Literatures in the scientific database of recent randomized controlled trials evaluating the indications for and use of antibiotics to reduce and treat SSIs for patients undergoing plastic surgery from 1960 to 2017– (Medline, Embase, the Cochrane Library as well as NHS centre websites were searched for English Publications from both reprint requests and by searching the database. Data extracted included antibiotic dosage, duration and incidence of surgical site infection.

Conclusion: surgical procedures must be distinguished based on the risk of infection and the need for antibiotic prophylaxis should be determined accordingly, i.e. on a case by case basis.No prophylaxis is required for superficial skin's and clean surgeries such as mucosal excisions, nevertheless, Antibiotic prophylaxis is recommended microsurgical operations, prosthetic surgery, incisional hernias, clean non-prosthetic osteoarticular surgery, oral cavity and genitourinary system procedures.

Still, antibiotic use should be prescribed with caution to avoid profound side effects such as developing resistant bacterial strains, severe allergies and other accompanied comorbidities.

Keywords: Antibiotic prophylaxis, Surgical site infection (SSI), Infections in plastic surgery, SSI prevention..

INTRODUCTION

Skin is basically a natural barrier against infection and despite many precautions and protocols to prevent infection in place, any surgery that causes a break in the skin may in turn cause an infection.

Surgical site infections (SSIs) are infections of the incision of organ or space that occur after surgery[(1)]. Surgical site infections can sometimes be superficial infections involving the skin only, however other surgical site infections are more serious and can involve tissues under the skin, organs, or implanted material. CDC provides guidelines and tools to the healthcare community to help end surgical site infections and resources to help the public understand these infections and take measures to safeguard their own health when possible[(1)]. The CDC healthcare-associated infection (HAI) prevalence survey found that there were an estimated 157,500 surgical site infections associated with inpatient surgeries in 2011 [(2)]. NHSN data included 16,147 SSIs following 849,659 operative procedures in all groups reported, for an overall SSI rate of 1.9% between 2006-2008 [(3)]. A 19% decrease in SSI related to 10 select procedures was reported between 2008 and 2013[(4)].

They threaten the lives of millions of patients each year and contribute to the spread of antibiotic resistance. In low- and middle-income countries, 11% of patients who undergo surgery are infected in the process. In Africa, up to 20% of women who have a caesarean section contract a wound infection, compromising their own health and their ability to care for their babies. But surgical site infections are not just a problem for poor countries [(5)].

Before the mid-19th Century, the majority of surgical patients developed SSI. The process began with an "irritative fever," followed by purulent drainage from the incision as well as sepsis and death. The face of surgery changed radically when Joseph Lister, in the late 1860s, introduced the principles of antisepsis, decreasing patient suffering by reducing postoperative infectious morbidity substantially [(6)].Since then, advances in surgical techniques, including better hemostasis, conservation of an adequate blood supply, hypothermia prevention,

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atraumatic tissue handling, and infection control practices such as better operating room ventilation, sterilization methods, and the use of antimicrobial prophylaxis, have continued to decrease SSI [7].

Surgical site infections (SSIs) may lead to a significant morbidity for affected patients, a need for secondary operations, prolonged hospital stays and increased utilization of health care resources. Self-reported data have been noted to be of considerable value in other surgical specialities for determining infection rates when other sources of information are lacking [8]. An estimated 2.7 million cosmetic procedures were performed in the United States in 1998, yet the role of preoperative antibiotic prophylaxis for cosmetic surgery is not clearly defined. Routine antibiotic prophylaxis for cosmetic procedures was discontinued by the senior author at the authors' institution to reduce use and cost in June of 1999. Subsequently, a cluster of four Staphylococcus aureus postoperative surgical site infections were identified [9].

Prevention of surgical site infection (SSI) is of great concern in surgery. The SSI rate reported by the Center for Disease Control and Prevention (CDC) is 2.7%, representing the second most common cause of nosocomial infection and accounting for 14-16% of all hospital-acquired infections.Prophylactic administration of antibiotics aims at preventing extrinsic or intrinsic bacterial contamination of the surgical site from developing into postoperative infection, and has demonstrated its efficacy in reducing the SSI rate[10].

It has been reported that 5% of all patients undergoing plastic surgery develop SSIs, accounting for 20% of health care-related infections. Surgical technique, suture type and placement of drains can influence infection rates [11].

Surgical site infections (SSI) following body contouring plastic surgery (BCPS) poses a significant burden for both patients, caregivers and healthcare system. SSI might lead to undesired surgical outcomes, ranging from unaesthetic surgical scar and prolonged hospitalization up to permanent disability and even death. Reported rate of SSI following BCPS is 2–7%, but is estimated much higher among different subgroups such as massive weight loss patients[12].

While guidelines have focused on the use of antibiotics for surgery in general, few literature have addressed plastic surgery specifically.

The purpose of this review is to evaluate antibiotic prophylaxis for SSI in Plastic surgery.

METHODS

Electronic search of available Literatures in the scientific database of recent randomized controlled trials evaluating the indications for and use of antibiotics to reduce and treat SSIs for patients undergoing plastic surgery from 1960 to 2017– (Medline, Embase, the Cochrane Library as well as NHS centre websites were searched for English Publications were obtained from both reprint requests and by searching the database. Data extracted included antibiotic dosage, duration and incidence ofsurgicalsite infection.

The study was done according to the ethical board of King Abdulaziz university.

Surgical Site Infection (SSI) criteria for definition

There are 3 different types of surgical site infection defined by the Centers for Disease Control and Prevention (CDC)[7]

Table 1: Different types of SSI classified by CDC

Superficial Incisional SSI
Infection occurs within 30 days after the operation *and* infection involves only skin or subcutaneous tissue of the incision *and* at least *one* of the following:
1. Purulent drainage, with or without laboratory confirmation, from the superficial incision.
2. Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
3. At least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat *and* superficial incision is deliberately opened by surgeon, *unless* incision is culture-negative.
4. Diagnosis of superficial incisional SSI by the surgeon or attending physician.
Do *not* report the following conditions as SSI:
1. Stitch abscess (minimal inflammation and discharge confined to the points of suture penetration).
2. Infection of an episiotomy or newborn circumcision site.
3. Infected burn wound.
4. Incisional SSI that extends into the fascial and muscle layers (see deep incisional SSI).
Note: Specific criteria are used for identifying infected episiotomy and circumcision sites and burn wounds.

Deep Incisional SSI
Infection occurs within 30 days after the operation if no implant* is left in place or within 1 year if implant is in place and the infection appears to be related to the operation and infection involves deep soft tissues (eg, fascial and muscle layers) of the incision and at least one of the following:
1. Purulent drainage from the deep incision but not from the organ/space component of the surgical site.
2. A deep incision spontaneously dehisces or is deliberately opened by a surgeon when the patient has at least one of the following signs or symptoms: fever (>38°C), localized pain, or tenderness, unless site is culture-negative.
3. An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination.
4. Diagnosis of a deep incisional SSI by a surgeon or attending physician.
Notes:
1. Report infection that involves both superficial and deep incision sites as deep incisional SSI.
2. Report an organ/space SSI that drains through the incision as a deep incisional SSI.
Organ/Space SSI
Infection occurs within 30 days after the operation if no implant* is left in place or within 1 year if implant is in place and the infection appears to be related to the operation and infection involves any part of the anatomy (eg, organs or spaces), other than the incision, which was opened or manipulated during an operation and at least one of the following:
1. Purulent drainage from a drain that is placed through a stab wound† into the organ/space.
2. Organisms isolated from an aseptically obtained culture or fluid or tissue in the organ/space.
3. An abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination.
4. Diagnosis of an organ/space SSI by a surgeon or attending physician.

*National Nosocomial Infection Surveillance definition: a nonhuman-derived implantable foreign body (e.g., prosthetic heart valve, nonhuman vascular graft, mechanical heart, or hip prosthesis) that is permanently placed in a patient during surgery. If the area around a stab wound becomes infected, it is not an SSI. It is considered a skin or soft tissue infection, depending on its depth.

PROPHYLACTIC ANTIBIOTICS IN PLASTIC SURGERY

1.Preoperative antibiotic treatment

Surgical antimicrobial prophylaxis" refers to a brief course of an antimicrobial agent initiated before an operation [(13)]. Its purpose is to reduce the microbial burden of intra-operative contamination to a level that should not overwhelm host defenses. The administration of preoperative antibiotics has become a part of routine operating room protocols.

The use of antibiotics for appropriate cases (usually clean-contaminated, dirty, or clean cases where prosthetic material is implanted) makes intuitive sense and is easy and inexpensive, and several publications have reported its benefits.However, the optimal timing for antibiotic prophylaxis is debatable[(14)]. The Centers for Disease Control and Prevention recommends administering antibiotics between 120 minutes (for vancomycin) and 60 minutes (for all others) before incision [8] .According to the Surgical Care Improvement Project (SCIP), patients who received antibiotics within 30 minutes of the incision had the lowest risk of infection[(15)]. Other investigators have suggested that rates of infection are lower if the antibiotic is administered a short time ; less than 30 minutes to immediately before the initial incision[(14)]. However, the administration of prophylactic antibiotics may not decrease infection rates in clean-contaminated plastic surgery cases[(16)],and consensus guidelines for antibiotic prophylaxis in plastic surgery are not available. In this retrospective review of an outpatient plastic surgery population, the authors evaluated the timing of preoperative antibiotic delivery and the occurrence of postoperative antibiotic administration to discern potential correlations with complication rates and to assess whether prophylactic antibiotics are beneficial in this surgical setting.

Resistant organisms

Staphylococcus aureus is one of the most common microorganisms involved in SSI. It accounts for 20% of SSI in general hospitals [(7)].A combination of nasal colonization and immuno-evasive strategies of *S.aureus* prompted it to be a major pathogen responsible for healthcare associated infection [(17)]. After emergence of MRSA in the United Kingdom in 1961[(18)], MRSA has become a hospital superbug throughout the world. MRSA is now responsible for 30% or more of all serious infections and is always

not very easy to deal with [19]. The prolonged stay in hospital, arbitrary use of antibiotics, lack of awareness, over the counter dispensing of antibiotics etc. are the potential predisposing factors for emergence of MRSA [19]. Methicillin resistance is due to the acquisition of *mecA* gene which encodes a unique penicillin-binding protein, designated PBP 2′ or PBP 2a. This reduces affinity for β-lactams and allows effective cell wall synthesis even in the presence of penicillins including anti-staphylococcal penicillins, as well as cephalosporins and carbapenems [20]. Therefore, the choice of drugs becomes limited to combat the MRSA strains.

The proportion of SSIs due to *S. aureus* increased from 16.6% to 30.9% during the period from 1992 to 2002, when the number of MRSA isolates also raised from 9.2% to 49.3% [21]. So, rational and restricted use of antibiotic is the essence of the day to confine the upsurge of this deadly MRSA strains. However, there are reports confirming that prophylactic administration of antibiotics in preoperative period (< 60 minutes before incision) significantly reduce SSIs after clean as well as contaminated operations

Whether vancomycin, as a prophylactic antibiotic, should be used routinely has been addressed by several studies. Although it may be the antibiotic of choice in patients with an allergy to cephalosporins, routine use is not recommended unless there is a very high risk of methicillin-resistant *Staphylococcus aureusm* (MRSA). Disturbingly, Anderson et al. [22]found that MRSA, followed by methicillin-sensitive *S. aureus*(MSSA), were the pathogens most commonly recovered after surgical procedures in certain areas. The prevalence rate of MRSA-associated SSI almost doubled during their study period, from 0.12 to 0.23 infections per 100 procedures ($p < 0.0001$). These infections, as reported by Engemann et al. [23], led to a higher 90-day mortality rate, longer hospitalization after diagnosis of infection, and higher hospital charges, initiating the idea that vancomycin could be a beneficial perioperative antibiotic. However, Finkelstein et al. [24], in a randomized controlled trial, found no significant difference in efficacy between vancomycin and cefazolin prophylaxis in preventing SSI in tertiary medical centers with high MRSA prevalence. Because vancomycin requires longer infusion times and is outside the usual operating room protocols with inconclusive data in favor of its use, we suggest continued use of cefazolin with discontinuation 24 h post-procedure unless there is an extraordinarily high risk of MRSA infection.

Moreover, Antibiogram was performed using doxycycline (30μg) and tigecycline (15 μg) discs. They showed encouraging result with 100% sensitivity for tigecycline and 72.28% sensitivity to doxycycline. The sensitivity to tigecycline has been reported to be 100% against MRSA in other studies from India [25]. As they were not much used in clinical practice, these two drugs might act as important weapons against MRSA just like vancomycin and linezolid. In this study, newer antibiotics like quinupristin - dalfopristin and daptomycin were not used. Few reports from India had shown encouraging results with these antibiotics [26]. The initial dose of prophylactic antibiotics should be timed so that an inhibitory concentration of the drug is established in the serum and tissues by the time the skin is incised [7]. Since most prophylactic antibiotics exhibit time-dependent bactericidal action, the proper timing of antibiotics in relation to surgical incision is of utmost importance [7]. Classen et al. [27]evaluated this question prospectively in patients undergoing elective clean or clean-contaminated procedures. Surgical site infection rates were significantly lower in patients whose perioperative antibiotics were administered within 2 h of the incision (1.4%) compared with 3.3% in those with postoperative (3–24 h post-procedure) administration and 3.8% in those having preoperative (2–24 h before the procedure) administration. With accordance to this evidence, perioperative antibiotics should be administered right after the incision time. Furthermore, so as to maximize the benefit of prophylactic antibiotics, therapeutic concentrations of the drug should be maintained throughout the procedure as well as for several hours after the incision is closed [28]. This would require antibiotic re-dosing at 3-h intervals for cefazolin, for example [29].

2. Additional Intra-operative doses

It is clear in view of the accumulating evidence that high antibiotic levels at the site of incision for the full duration of the operation, are crucial for effective prophylaxis, however, Patients who experience major blood loss (greater than 1500mls) should acquire fluid resuscitation, followed by redosing with the recommended prophylaxis regimen for that operation)[30].

Moreover, for operations lasting >3 hours, re-dosing may be necessary, as illustrated in table 2[31].

Table 2: Redosing recommendation by NHS Trust guidelines

Antibiotic	Recommended re-dosing interval/dose to give
Co-amoxiclav	4 hours, give 1.2g IV
Flucloxacillin	3 hours, give 1g IV
Gentamicin	re-dosing not recommended
Teicoplanin	re-dosing not recommended
Metronidazole	8 hours, give 500mg IV

3. Post-operative antibiotic prophylaxis

Studies have shown that giving additional antibiotic prophylaxis after wound closure does not reduce infection rates further. In leech therapy, Aeromonas infection from the leech flora can cause infection in up to 36% of cases, with complications ranging from minor wound complications to extensive tissue loss and septicaemia [(32)]. Thus, antibiotics are warranted for the duration of treatment. Burns injuries are not classified as SSIs. Burns patients are much more susceptible to hospital–acquired infections, with bacterial translocation of the colon and staphylococci inhabiting hair follicles and sweat glands being two such potential sources. A recent meta-analysis[(33)] (n=1113) suggests that giving systemic antibiotics for the first 4–14 days following admission reduces mortality by almost half, with a number needed to treat (NNT) of 8.

PROPHYLACTIC ANTIBIOTICS IN PLASTIC SURGERY [(34)]

Table 3 lists down the recommended prophylactic antibiotics in plastic surgery

Table 3: guidelines for prophylactic antibiotics in plastic surgery by NHS Trust **[(34)]**

Indication	Antibiotic – First Line	Antibiotic – Penicillin Allergy OR Known MRSA
Abdominoplasty / liposuction	Flucloxacillin 1g IV plus	Teicoplanin 600mg IV plus
	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg) + Metronidazole 500mg IV	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg) + Metronidazole 500mg IV
All Breast Surgery	Flucloxacillin 1g IV plus	Teicoplanin 600mg IV plus
	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg)	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg)
DIEP (Deep Inferior Epigastric perforator)	Flucloxacillin 1g IV plus	Teicoplanin 600mg IV plus
	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg) + Metronidazole 500mg IV	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg)
Free flaps - clean, no bony fixation	Flucloxacillin 1g IV	Teicoplanin 600mg IV
Free flaps – dirty	Co-amoxiclav 1.2g IV plus	Teicoplanin 600mg IV plus
	Metronidazole 500mg IV	Metronidazole 500mg IV Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg
Free Flaps – clean with bony fixation	Flucloxacillin IV 1g then 1g 6 hourly for 3 more doses plus	Teicoplanin 600mg IV plus
	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg)	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg)
Hand trauma	No antibacterials unless involvement of joint or contamination of wound	Teicoplanin 600mg IV plus
	Co-amoxiclav 1.2g IV	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg)
Implant insertion (any)	Flucloxacillin 1g IV + Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg)	Teicoplanin 600mg IV + Gentamicin IV 2mg/kg on induction. (Approximate to nearest 20mg)
Lymph node dissection (Groin)	Flucloxacillin 1g IV plus	Teicoplanin 600mg IV plus
	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg) + Metronidazole 500mg IV	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg) plus Metronidazole 500mg IV
Lymph node	Flucloxacillin 1g IV plus	Teicoplanin 600mg IV plus

dissection (neck/axilla)	Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg)		Gentamicin IV 2mg/kg on induction (Approximate to nearest 20mg)
Major head and neck surgery (> 1 hour duration) / free flaps	On induction: Co-amoxiclav 1.2g IV + Metronidazole 500mg IV		On induction: Teicoplanin 600mg IV + Metronidazole 500mg IV
	Then Post operative for 5 days: Co-amoxiclav 1.2g IV eight hourly + Metronidazole 500mg IV eight hourly		Then Postoperative for 5 days: Clindamycin 300mg PO six hourly (If NBM, Teicoplanin 400mg IV OD) + Metronidazole 400mg PO eight hourly (if NBM 500mg IV eight hourly)
orthognathic Surgery	Metronidazole 500mg IV + Co-amoxiclav 1.2g IV		Teicoplanin 600mg IV + Metronidazole 500mg IV
Perioral surgery	Flucloxacillin 1g IV + Metronidazole 500mg IV		Teicoplanin 600mg IV+ Metronidazole 500mg IV
Pressure sore surgery (including infected ulcer surgery)	Where possible take swabs for culture to target antibiotic prophylaxis		Teicoplanin 600mg IV then 400mg 24 hours later plus
	If not practicable, use: Flucloxacillin 1g IV then 1g six hourly + Metronidazole 500mg IV then 500mg eight hourly + Benzylpenicillin 1.2g IV then 1.2g six hourly. Continue all for 48 hours		Metronidazole 500mg IV TDS
Ulcerated skin cancers	Flucloxacillin 1g IV		Teicoplanin 600mg IV
	If excision under local anesthetic, flucloxacillin 1g po		If excision under local anesthetic, clindamycin 300-450mg po
	For lesions known or suspected to be infected then refer to the guidance for scalp lesions		For lesions known or suspected to be infected then refer to the guidance for scalp lesions
Bite wounds – animal and human	Adults and children over 12 years:	Adults and children over 12 years:	ADULTS
	Co-amoxiclav 1.2g IV 8 hourly. Convert to oral as soon as possible	Co-amoxiclav 625mg PO TDS for 7 days. Longer courses may be appropriate if severe infection.	Ciprofloxacin 400mg IV over 30 minutes plus Clindamycin 1.2g IV. 6 hours later: Clindamycin 300-450mg po* or IV, thereafter 300-450mg six hourly for 7 days. Plus Ciprofloxacin 500mg po * 12 hourly for 7 days
		Co-amoxiclav 0.25ml/kg of *125/31* suspension 3 times daily; dose doubled in severe infection daily	Azithromycin plus Metronidazole for 5 days Azithromycin Dose po
	Children: Child 1 month – 12 years	Child 6 - 12 years	For children over 6 months of age:
	Co-amoxiclav 30mg/kg IV 8 hourly. Convert to oral as soon as possible.	Co-amoxiclav 0.15ml/kg of *250/62* suspension 3 times daily; dose doubled in severe infection	Body weight up to 15kg: 10mg/kd OD. Body weight 15-25kg: 200mg OD Body weight 26-35kg: 300mg OD Body weight 36-45kg: 400mg OD Body weight >45kg: 500mg OD
			Metronidazole Dose po
			Child 1-2 months: 7.5mg/kg BD Child 2months-18 years: 7.5mg/kg (Max 400mg) TDS
Scalp lesions – potentially infected	Flucloxacillin IV 1g then 500mg PO six hourly (IV if NBM) for 5 days		Penicillin allergy or known MRSA : Teicoplanin 600mg IV then Clindamycin 300mg PO six hourly for 5 days
Leeches	Ciprofloxacin 500mg PO twelve hourly until 24 hours after leeches removed		

SIDE EFFECT OF ANTIBIOTICS

The extensive use of antibiotics for prophylaxis comes with a cost. Below are some side effects :

1. Development of Penicillin allergy by some patients : Although most allergies to penicillin and cephalosporins manifest as a simple rash, potential adverse reactions include anaphylaxis, angioedema, urticaria, bronchospasm, hemolytic anemia, interstitial nephritis, thrombocytopenia, and Stevens-Johnson syndrome[35].
2. Altering normal fecal flora disturbance of gastrointestinal microecology leads to a colonization by potentially pathogenic microbes leading to infection with *Clostridium difficile* [36].
3. Candidal vaginitis results from suppression of natural bacterial flora and overgrowth of yeast. It is reported that as many as 2% of patients receiving prophylactic antibiotics develop a yeast infection requiring additional antifungal treatment[37].
4. Comment side effects :nausea, vomiting, diarrhea, rashes, and pruritus. These potential complications accrue additional costs for the patient and result in potential hospitalization, loss of work, and further antibiotic administration.
5. Emergence of Multidrug-resistant organisms such as methicillin-resistant *Staphylococcus aureus* (MRSA) have become commonplace in the hospital setting[38].

CURRENT PRACTICE IN PLASTIC SURGERY

Plentiful surveys revealed the prevalentuse of prophylactic antibiotics in plastic surgery. Some Questionnaires surveying 1718 plastic surgeons in the 1970s and 1980s showed an increase in the administration of prophylactic antibiotics from prior years[39].The questions touched upon the frequency, timing of administration, and factors modifying a surgeon's decision in using prophylactic antibiotics. It was concluded that the overall use of antibiotics was increasing and that the use of alloplastic implants and the medicolegal environment were motivating factors. Other reports have concluded that most plastic surgeons justify their use by personal experience, prior teaching, custom, and medicolegal concerns.

Perrotti *et al.*[40]surveyed 1767 plastic surgeons on the type, route, and duration of antibiotic administration for 10 popular cosmetic surgical procedures. It was found that cephalosporins were the most popular prophylaxis given and that many different antibiotic irrigations were used as well. Antibiotics were frequently used and many physicians continued them to up to 7 days. Administration beyond the perioperative period was seen in 54% of liposuction patients, 52% of face lift patients, 55% of rhinoplasty patients, 65% of abdominoplasty patients, and 70% of breast augmentation patients. In addition, 61% used antibiotics when drains were in place despite literature stating that antibiotic prophylaxis extended to cover lines, tubes, or catheters is unwarranted [41].In this study, many plastic surgeons similarly justified their use of antibiotics on the basis of common practice, regimen, medicolegal ramifications, and the inability to afford a complication in a cosmetic setting.

CONCLUSION AND RECOMMENDATION

After extensive review of the current literatures, it could be concluded that surgical procedures must be distinguished based on the risk of infection and the need for antibiotic prophylaxis should be determined accordingly, i.e. on a case by case basis.

No prophylaxis is required for superficial skin'sand clean surgeries such as mucosal excisions, nevertheless, Antibiotic prophylaxis is recommended for microsurgical operations, prosthetic surgery, incisional hernias, clean non-prosthetic osteoarticular surgery, oral cavity and genitourinary system procedures.

Still, antibiotic use should be prescribed with caution to avoid profound side effects such as developing resistant bacterial strains, severe allergies and other accompanied comorbidities.

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