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Date: 24 June 2019

Sources Searched: Medline, Embase.

Clopidogrel (Maternal Safety)

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1. Continuation versus discontinuation of antiplatelet therapy for bleeding and ischaemic events in adults undergoing non-cardiac surgery.

Author(s): Lewis, Sharon R; Pritchard, Michael W; Schofield-Robinson, Oliver J; Alderson, Phil; Smith, Andrew F

Source: The Cochrane database of systematic reviews; Jul 2018; vol. 7 ; p. CD012584

Publication Date: Jul 2018

Publication Type(s): Research Support, Non-u.s. Gov't Meta-analysis Journal Article Review Systematic Review

PubMedID: 30019463

Available at [The Cochrane database of systematic reviews](#) - from Cochrane Collaboration (Wiley)

Abstract:BACKGROUND Antiplatelet agents are recommended for people with myocardial infarction and acute coronary syndromes, transient ischaemic attack or stroke, and for those in whom coronary stents have been inserted. People who take antiplatelet agents are at increased risk of adverse events when undergoing non-cardiac surgery because of these indications. However, taking antiplatelet therapy also introduces risk to the person undergoing surgery because the likelihood of bleeding is increased. Discontinuing antiplatelet therapy before surgery might reduce this risk but subsequently it might make thrombotic problems, such as myocardial infarction, more likely.OBJECTIVESTo compare the effects of continuation versus discontinuation for at least five days of antiplatelet therapy on the occurrence of bleeding and ischaemic events in adults undergoing non-cardiac surgery under general, spinal or regional anaesthesia.SEARCH METHODSWe searched the Cochrane Central Register of Controlled Trials (CENTRAL; 2018, Issue 1), MEDLINE (1946 to January 2018), and Embase (1974 to January 2018). We searched clinical trials registers for ongoing studies, and conducted backward and forward citation searching of relevant articles.SELECTION CRITERIAWe included randomized controlled trials of adults who were taking single or dual antiplatelet therapy, for at least two weeks, and were scheduled for elective non-cardiac surgery. Included participants had at least one cardiac risk factor. We planned to include quasi-randomized studies.We excluded people scheduled for minor surgeries under local anaesthetic or sedation in which bleeding that required transfusion or additional surgery was unlikely. We included studies which compared perioperative continuation of antiplatelet therapy versus discontinuation of antiplatelet therapy or versus substitution of antiplatelet therapy with a placebo for at least five days before surgery.DATA COLLECTION AND ANALYSISTwo review authors independently assessed studies for inclusion, extracted data, assessed risk of bias and synthesized findings. Our primary



outcomes were: all-cause mortality at longest follow-up (up to six months); all-cause mortality (up to 30 days). Secondary outcomes included: blood loss requiring transfusion of blood products; blood loss requiring further surgical intervention; risk of ischaemic events. We used GRADE to assess the quality of evidence for each outcome MAIN RESULTS: We included five RCTs with 666 randomized adults. We identified three ongoing studies. All study participants were scheduled for elective general surgery (including abdominal, urological, orthopaedic and gynaecological surgery) under general, spinal or regional anaesthesia. Studies compared continuation of single or dual antiplatelet therapy (aspirin or clopidogrel) with discontinuation of therapy for at least five days before surgery. Three studies reported adequate methods of randomization, and two reported methods to conceal allocation. Three studies were placebo-controlled trials and were at low risk of performance bias, and three studies reported adequate methods to blind outcome assessors to group allocation. Attrition was limited in four studies and two studies had reported prospective registration with clinical trial registers and were at low risk of selective outcome reporting bias. We reported mortality at two time points: the longest follow-up reported by study authors up to six months, and time point reported by study authors up to 30 days. Five studies reported mortality up to six months (of which four studies had a longest follow-up at 30 days, and one study at 90 days) and we found that either continuation or discontinuation of antiplatelet therapy may make little or no difference to mortality up to six months (risk ratio (RR) 1.21, 95% confidence interval (CI) 0.34 to 4.27; 659 participants; low-certainty evidence); the absolute effect is three more deaths per 1000 with continuation of antiplatelets (ranging from eight fewer to 40 more). Combining the four studies with a longest follow-up at 30 days alone showed the same effect estimate, and we found that either continuation or discontinuation of antiplatelet therapy may make little or no difference to mortality at 30 days after surgery (RR 1.21, 95% CI 0.34 to 4.27; 616 participants; low-certainty evidence); the absolute effect is three more deaths per 1000 with continuation of antiplatelets (ranging from nine fewer to 42 more). We found that either continuation or discontinuation of antiplatelet therapy probably makes little or no difference in incidences of blood loss requiring transfusion (RR 1.37, 95% CI 0.83 to 2.26; 368 participants; absolute effect of 42 more participants per 1000 requiring transfusion in the continuation group, ranging from 19 fewer to 119 more; four studies; moderate-certainty evidence); and may make little or no difference in incidences of blood loss requiring additional surgery (RR 1.54, 95% CI 0.31 to 7.58; 368 participants; absolute effect of six more participants per 1000 requiring additional surgery in the continuation group, ranging from seven fewer to 71 more; four studies; low-certainty evidence). We found that either continuation or discontinuation of antiplatelet therapy may make little or no difference to incidences of ischaemic events (to include peripheral ischaemia, cerebral infarction, and myocardial infarction) within 30 days of surgery (RR 0.67, 95% CI 0.25 to 1.77; 616 participants; absolute effect of 17 fewer participants per 1000 with an ischaemic event in the continuation group, ranging from 39 fewer to 40 more; four studies; low-certainty evidence). We used the GRADE approach to downgrade evidence for all outcomes owing to limited evidence from few studies. We noted a wide confidence in effect estimates for mortality at the end of follow-up and at 30 days, and for blood loss requiring transfusion which suggested imprecision. We noted visual differences in study results for ischaemic events which suggested inconsistency. AUTHORS' CONCLUSIONS We found low-certainty evidence that either continuation or discontinuation of antiplatelet therapy before non-cardiac surgery may make little or no difference to mortality, bleeding requiring surgical intervention, or ischaemic events. We found moderate-certainty evidence that either continuation or discontinuation of antiplatelet therapy before non-cardiac surgery probably makes little or no difference to bleeding requiring transfusion. Evidence was limited to few studies with few participants, and with few events. The three ongoing studies may alter the conclusions of the review once published and assessed.



Database: Medline

2. European Guidelines on perioperative venous thromboembolism prophylaxis

Author(s): Afshari A.; Ageno W.; Ahmed A.; Duranteau J.; Faraoni D.; Kozek-Langenecker S.; Llau J.; Nizard J.; Solca M.; Stensballe J.; Thienpont E.; Tsiridis E.; Venclauskas L.; Samama C.M.

Source: European Journal of Anaesthesiology; Feb 2018; vol. 35 (no. 2); p. 77-83

Publication Date: Feb 2018

Publication Type(s): Article

Available at [European Journal of Anaesthesiology](#) - from Ovid (LWW Total Access Collection 2019 - with Neurology)

Database: EMBASE

3. 2017 ESC focused update on dual antiplatelet therapy in coronary artery disease developed in collaboration with EACTS: The Task Force for dual antiplatelet therapy in coronary artery disease of the European Society of Cardiology (ESC) and of the European Association for Cardio-Thoracic Surgery (EACTS).

Author(s): Valgimigli, Marco; Bueno, Héctor; Byrne, Robert A; Collet, Jean-Philippe; Costa, Francesco; Jeppsson, Anders; Jüni, Peter; Kastrati, Adnan; Kolh, Philippe; Mauri, Laura; Montalescot, Gilles; Neumann, Franz-Josef; Petricevic, Mate; Roffi, Marco; Steg, Philippe Gabriel; Windecker, Stephan; Zamorano, Jose Luis; Levine, Glenn N; ESC Scientific Document Group ; ESC Committee for Practice Guidelines (CPG) ; ESC National Cardiac Societies

Source: European heart journal; Jan 2018; vol. 39 (no. 3); p. 213-260

Publication Date: Jan 2018

Publication Type(s): Journal Article

PubMedID: 28886622

Available at [European heart journal](#) - from Oxford Journals - Medicine

Available at [European heart journal](#) - from Unpaywall

Database: Medline

4. Perioperative Management of the Gynecologic Patient on Long-term Anticoagulation

Author(s): Fager A.M.; Deans E.; James A.H.

Source: Clinical Obstetrics and Gynecology; 2018; vol. 61 (no. 2); p. 278-293

Publication Date: 2018

Publication Type(s): Article

PubMedID: 29688934

Available at [Clinical Obstetrics and Gynecology](#) - from Ovid (LWW Total Access Collection 2019 - with Neurology)

Abstract: The perioperative management of patients taking antithrombotic or antiplatelet medications is based on an assessment of the individual patient's risk for thrombosis or bleeding, the specific medication involved, and the nature of the planned procedure. This article describes specific strategies for whether and how these medications should be interrupted before gynecologic procedures, when they can be restarted following the procedure, and whether bridging therapy should be considered. Copyright © 2018 Wolters Kluwer Health, Inc. All rights reserved.

Database: EMBASE

5. Platelet Inhibition and Bleeding in Patients Undergoing Non-Cardiac Surgery-The BIANCA Observational Study.

Author(s): Mahla, Elisabeth; Metzler, Helfried; Bornemann-Cimenti, Helmar; Pruessler, Florian; Raggam, Reinhard B; Pregartner, Gudrun; Berghold, Andrea; Baumann, Anneliese; Goeroeg, Christian; Gurbel, Paul A

Source: Thrombosis and haemostasis; May 2018; vol. 118 (no. 5); p. 864-872

Publication Date: May 2018

Publication Type(s): Journal Article

PubMedID: 29625498

Abstract: Nearly 20% of patients will need non-cardiac surgery within 1 year of coronary stenting and their management is complicated by concomitant antiplatelet therapy. Platelet function testing may optimize the timing of surgery in these patients. In this prospective observational study, we explored the association between platelet reactivity and bleeding in patients undergoing non-cardiac surgery treated with clopidogrel with or without aspirin within 7 days before surgery. The timing of surgery was at the surgeon's discretion. Blood was drawn at induction of anaesthesia and platelet reactivity assessed by light transmittance aggregometry (LTA), vasodilator stimulated phosphoprotein (VASP) assay, Multiplate Analyzer and Innovance PFA-200. The primary endpoint was surgery-related thrombolysis in myocardial infarction (TIMI) bleeding. Among 197 patients enrolled, 72 and 12% underwent surgery within 24 and 48 hours of the last dose of clopidogrel, respectively. The median (interquartile range [IQR]) for pre-operative maximal adenosine diphosphate (ADP)-induced aggregation was 33.0% (21.0-57.5%), for VASP-platelet reactivity index was 61.5% (40.1-75.4%), for Multiplate was 22.0 (14.5-36.0) U*min and for Innovance PFA-200 was 224 (101.0-300.0) seconds. TIMI bleeding, observed in 25% of patients, decreased with increasing tertiles of platelet reactivity to ADP assessed by LTA ($p = 0.031$). Additionally, in a multivariable logistic regression analysis, platelet reactivity to ADP assessed by LTA was significantly associated with TIMI bleeding, as were age and urgency of surgery. These results demonstrate that in clopidogrel-treated patients, pre-operative platelet reactivity to ADP is associated with surgical bleeding risk. An objective assessment of pre-operative platelet function may optimize the timing of non-cardiac surgery in these patients.

Database: Medline

6. A Meta-analysis of the Impact of Aspirin, Clopidogrel, and Dual Antiplatelet Therapy on Bleeding Complications in Noncardiac Surgery.

Author(s): Columbo, Jesse A; Lambour, Andrew J; Sundling, Rebecca A; Chauhan, Nirali B; Bessen, Sarah Y; Linshaw, David L; Kang, Ravinder; Riblet, Natalie B V; Goodney, Philip P; Stone, David H

Source: Annals of surgery; Jan 2018; vol. 267 (no. 1); p. 1-10

Publication Date: Jan 2018

Publication Type(s): Meta-analysis Journal Article Review Systematic Review

PubMedID: 28463896

Available at [Annals of surgery](#) - from Ovid (LWW Total Access Collection 2019 - with Neurology)

Abstract:OBJECTIVE The aim of this study was to determine the bleeding risks associated with single (aspirin) and dual (aspirin + clopidogrel) antiplatelet therapy (DAPT) versus placebo or no treatment in adults undergoing noncardiac surgery.SUMMARY OF BACKGROUND DATAThe impact of antiplatelet therapy on bleeding during noncardiac surgery remains controversial. A meta-analysis was performed to examine the risk associated with single and DAPT.METHODSA systematic review of antiplatelet therapy, noncardiac surgery, and perioperative bleeding was performed. Peer-reviewed sources and meeting abstracts from relevant societies were queried. Studies without a control group, or those that only examined patients with coronary stents, were excluded. Primary endpoints were transfusion and reintervention for bleeding.RESULTSO f 11,592 references, 46 studies met inclusion criteria. In a meta-analysis of >30,000 patients, the relative risk (RR) of transfusion versus control was 1.14 [95% confidence interval (CI) 1.03-1.26, P = 0.009] for aspirin, and 1.33 (1.15-1.55, P = 0.001) for DAPT. Clopidogrel had an elevated risk, but data were too heterogeneous to analyze. The RR of bleeding requiring reintervention was not significantly higher for any agent compared to control [RR 0.96 (0.76-1.22, P = 0.76) for aspirin, 1.84 (0.87-3.87, P = 0.11) for clopidogrel, and 1.51 (0.92-2.49, P = 0.1) for DAPT]. Subanalysis of thoracic and abdominal procedures was similar. There was no difference in RR for myocardial infarction [1.06 (0.79-1.43)], stroke [0.97 (0.71-1.33)], or mortality [0.97 (0.87-1.1)].CONCLUSIONSAntiplatelet therapy at the time of noncardiac surgery confers minimal bleeding risk with no difference in thrombotic complications. In many cases, it is safe to continue antiplatelet therapy in patients with important indications for their use.

Database: Medline



7. Perioperative management of patient with intracoronary stent presenting for noncardiac surgery

Author(s): Gurajala I.; Gopinath R.

Source: Annals of Cardiac Anaesthesia; 2016; vol. 19 (no. 1); p. 122-131

Publication Date: 2016

Publication Type(s): Review

PubMedID: 26750683

Available at [Annals of Cardiac Anaesthesia](#) - from Europe PubMed Central - Open Access

Available at [Annals of Cardiac Anaesthesia](#) - from ProQuest (Health Research Premium) - NHS Version

Available at [Annals of Cardiac Anaesthesia](#) - from Unpaywall

Abstract:As the number of percutaneous coronary interventions increase annually, patients with intracoronary stents (ICS) who present for noncardiac surgery (NCS) are also on the rise. ICS is associated with stent thrombosis (STH) and requires mandatory antiplatelet therapy to prevent major adverse cardiac events. The risks of bleeding and ischemia remain significant and the management of these patients, especially in the initial year of ICS is challenging. The American College of Cardiologists guidelines on the management of patients with ICS recommend dual antiplatelet therapy (DAT) for minimal 14 days after balloon angioplasty, 30 days for bare metal stents, and 365 days for drug-eluting stents. Postponement of elective surgery is advocated during this period, but guidelines concerning emergency NCS are ambiguous. The risk of STH and surgical bleeding needs to be assessed carefully and many factors which are implicated in STH, apart from the type of stent and the duration of DAT, need to be considered when decision to discontinue DAT is made. DAT management should be a multidisciplinary exercise and bridging therapy with shorter acting intravenous antiplatelet drugs should be contemplated whenever possible. Well conducted clinical trials are needed to establish guidelines as regards to the appropriate tests for platelet function monitoring in patients undergoing NCS while on DAT. Copyright © 2016 Annals of Cardiac Anaesthesia.

Database: EMBASE

8. Peri-operative management of anticoagulation and antiplatelet therapy.

Author(s): Keeling, David; Tait, R Campbell; Watson, Henry; British Committee of Standards for Haematology

Source: British journal of haematology; Nov 2016; vol. 175 (no. 4); p. 602-613

Publication Date: Nov 2016

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

PubMedID: 27714755

Available at [British Journal of Haematology](#) - from Wiley Online Library Science , Technology and Medicine Collection 2017

Available at [British Journal of Haematology](#) - from Unpaywall

Database: Medline

9. Preoperative antiplatelet use does not increase incidence of bleeding after major operations

Author(s): Strosberg D.S.; Starr J.E.; Corbey T.; Henry J.C.

Source: Surgery (United States); Oct 2016; vol. 160 (no. 4); p. 968-976

Publication Date: Oct 2016

Publication Type(s): Article

PubMedID: 27450711

Abstract:Background This study examined the outcomes of patients holding or continuing clopidogrel during the preoperative period. Methods We reviewed all patients taking clopidogrel who underwent one of 72 different Current Procedural Terminology code procedures, representing major emergency and elective general thoracic and vascular operations from 2009-2012 at a single institution. Demographics, comorbidities, aspirin use, details of coronary stents, and perioperative events were collected. Results A total of 2,154 major operative procedures were performed on 1,851 patients during the study period. A total of 213 patients (11.5%) were taking clopidogrel at the time of their last office visit or hospital admission and were then instructed to hold or continue the drug prior to an operation. A total of 205 procedures in 200 patients comprised the final study population. Clopidogrel was held in 116 procedures for ≥ 5 days prior to operative intervention (56.6%, Group A), and clopidogrel was administered within 5 days of an operation in 89 procedures (43.4%, Group B). There were no differences between the 2 groups regarding estimated blood loss, units transfused, myocardial infarction, stroke, acute visceral or peripheral ischemia, or death within 30 days. Conclusion We did not identify significantly increased adverse patient outcomes in those patients who received preoperative clopidogrel within this population. We assert that it appears to be reasonable and safe to continue antiplatelet therapy with clopidogrel in this population in elective situations and that preoperative clopidogrel use does not increase the risk of bleeding in emergency circumstances. Copyright © 2016 Elsevier Inc.



Database: EMBASE

10. The evaluation of clopidogrel use in perioperative general surgery patients: A prospective randomized controlled trial

Author(s): Chu E.W.; Chernoguz A.; Divino C.M.

Source: American Journal of Surgery; Jun 2016; vol. 211 (no. 6); p. 1019-1025

Publication Date: Jun 2016

Publication Type(s): Article

Available at [American Journal of Surgery](#) - from ProQuest (Health Research Premium) - NHS Version

Abstract:Background The perioperative safety profile of clopidogrel, a potent antiplatelet agent used in the management of cardiovascular disease, is unknown, and there are no evidence-based guidelines recommending for either its interruption or continuation at this time. The aim of this study was to determine whether patients who are maintained on clopidogrel before general surgical procedures are at increased risk of perioperative bleeding complications. Methods Patients receiving clopidogrel at the time of elective general surgery were randomized to either discontinue clopidogrel 1 week before surgery (group A) or continue clopidogrel into surgery (group B). All other antiplatelet and anticoagulant agents were discontinued before surgery. The primary end points were perioperative bleeding requiring intraoperative or postoperative transfusion of blood or blood components and bleeding-related readmission, reoperation, or mortality within 90 days of surgery. The secondary end points were perioperative myocardial infarction or cerebrovascular accidents within 90 days of surgery. Results Thirty-nine patients were enrolled and underwent 43 general surgical operations. Twenty-one procedures were randomized to group A and 22 to group B. The most commonly performed individual procedures were open inguinal hernia repair (23%),

laparoscopic cholecystectomy (21%), open ventral hernia repair (15%), laparoscopic ventral hernia repair (11%), and laparoscopic inguinal hernia repair (9%). No perioperative mortalities, bleeding events requiring blood transfusion, or reoperations occurred. One readmission for intra-abdominal hematoma requiring percutaneous drainage occurred in each group (group A: 4.8% vs group B: 4.5%; $P = 1.0$). No myocardial infarctions or cerebrovascular accidents were observed or reported. Conclusions The outcomes from this prospective study suggest that, patients undergoing commonly performed elective general surgical procedures can be safely maintained on clopidogrel without increased perioperative bleeding risk. Copyright © 2016 Elsevier Inc.

Database: EMBASE

11. Management of hemorrhage during gynecologic surgery

Author(s): Yu S.P.; Parker W.H.; Cohen J.G.

Source: Clinical Obstetrics and Gynecology; 2015; vol. 58 (no. 4); p. 718-731

Publication Date: 2015

Publication Type(s): Article

Available at [Clinical Obstetrics and Gynecology](#) - from Ovid (LWW Total Access Collection 2019 - with Neurology)

Abstract: Surgical blood loss of >1000mL or blood loss that requires a blood transfusion usually defines intraoperative hemorrhage. Intraoperative hemorrhage has been reported in 1% to 2% of hysterectomy studies. Cardiovascular instability with significant hypotension often results from a loss of 30% to 40% of the patient's blood volume and >40% blood loss is life threatening. Preparation, planning, and practicing for a massive hemorrhage is essential for all surgeons and gynecologic operating room teams. Emergency steps should be written and posted in the operating room and rehearsed quarterly.

Database: EMBASE

12. Chronic antithrombotic therapy and gynecologic surgery

Author(s): anonymous

Source: Obstetrics and Gynecology; Oct 2014; vol. 124 (no. 4); p. 856-862

Publication Date: Oct 2014

Publication Type(s): Review

PubMedID: 25244459

Available at [Obstetrics and Gynecology](#) - from Ovid (Journals @ Ovid) - Remote Access

Abstract: Surgery can present a management dilemma for gynecologists whose patients receive chronic antithrombotic therapy because the risk of hemorrhagic complications must be balanced against the risk of thromboembolic complications. Interruption of antithrombotic therapy to reduce perioperative bleeding poses a significant risk of recurrent thromboembolic events. Patients who receive chronic antithrombotic therapy should be seen at least 7 days before a planned procedure, and each woman should be included in decision making regarding risks and benefits specific to her situation. The schedule may need to be altered if the international normalized ratio is at a high level and in patients older than 75 years of age (who may need more time to correct their international normalized ratio). The patient's cardiologist often will have recommendations for the appropriate

bridging therapy for a specific valve or stent. A discussion of the risks and benefits of different management schemes for chronic antithrombotic therapy may involve the surgeon, the patient, the anesthesiologist, and the primary care physician. Copyright © American College of Obstetricians and Gynecologists.

Database: EMBASE

13. Perioperative management of antiplatelet therapy in patients with coronary stents undergoing cardiac and non-cardiac surgery: a consensus document from Italian cardiological, surgical and anaesthesiological societies.

Author(s): Rossini, Roberta; Musumeci, Giuseppe; Visconti, Luigi Oltrona; Bramucci, Ezio; Castiglioni, Battistina; De Servi, Stefano; Lettieri, Corrado; Lettino, Maddalena; Piccaluga, Emanuela; Savonitto, Stefano; Trabattoni, Daniela; Capodanno, Davide; Buffoli, Francesca; Parolari, Alessandro; Dionigi, Gianlorenzo; Boni, Luigi; Biglioli, Federico; Valdatta, Luigi; Droghetti, Andrea; Bozzani, Antonio; Setacci, Carlo; Ravelli, Paolo; Crescini, Claudio; Staurengi, Giovanni; Scarone, Pietro; Francetti, Luca; D'Angelo, Fabio; Gadda, Franco; Comel, Andrea; Salvi, Luca; Lorini, Luca; Antonelli, Massimo; Bovenzi, Francesco; Cremonesi, Alberto; Angiolillo, Dominick J; Guagliumi, Giulio; Italian Society of Invasive Cardiology (SICI-GISE); Italian Association of Hospital Cardiologists (ANMCO); Italian Society for Cardiac Surgery (SICCH); Italian Society of Vascular and Endovascular Surgery (SICVE); Italian Association of Hospital Surgeons (ACOI); Italian Society of Surgery (SIC); Italian Society of Anaesthesia and Intensive Care Medicine (SIAARTI); Lombard Society of Surgery (SLC); Italian Society of Maxillofacial Surgery (SICMF); Italian Society of Reconstructive Plastic Surgery and Aesthetics



(SICPRE); Italian Society of Thoracic Surgeons (SICT); Italian Society of Urology (SIU); Italian Society of Orthopaedics and Traumatology (SIOT); Italian Society of Periodontology (SIdP); Italian Federation of Scientific Societies of Digestive System Diseases Lombardia (FISMAD); Association of Obstetricians Gynaecologists Italian Hospital Lombardia (AOGOI); Society of Ophthalmology Lombardia (SOL)

Source: EuroIntervention : journal of EuroPCR in collaboration with the Working Group on Interventional Cardiology of the European Society of Cardiology; May 2014; vol. 10 (no. 1); p. 38-46

Publication Date: May 2014

Publication Type(s): Practice Guideline Journal Article Consensus Development Conference

PubMedID: 24832636

Available at [EuroIntervention : journal of EuroPCR in collaboration with the Working Group on Interventional Cardiology of the European Society of Cardiology](#) - from Free Medical Journals . com

Abstract:Optimal perioperative antiplatelet therapy in patients with coronary stents undergoing surgery still remains poorly defined and a matter of debate among cardiologists, surgeons and anaesthesiologists. Surgery represents one of the most common reasons for premature antiplatelet therapy discontinuation, which is associated with a significant increase in mortality and major adverse cardiac events, in particular stent thrombosis. Clinical practice guidelines provide little support with regard to managing antiplatelet therapy in the perioperative phase in the case of patients with non-deferrable surgical interventions and/or high haemorrhagic risk. Moreover, a standard definition of ischaemic and haemorrhagic risk has never been determined. Finally, recommendations shared by cardiologists, surgeons and anaesthesiologists are lacking. The present consensus document provides practical recommendations on the perioperative management of antiplatelet therapy in patients with coronary stents undergoing surgery. Cardiologists, surgeons and anaesthesiologists have contributed equally to its creation. On the basis of clinical and angiographic data, the individual thrombotic risk has been defined. All surgical interventions have been classified according to their inherent haemorrhagic risk. A consensus on the optimal antiplatelet regimen in the perioperative phase has been reached on the basis of the ischaemic and haemorrhagic risk. Aspirin should be continued perioperatively in the majority of surgical operations, whereas dual antiplatelet therapy should not be withdrawn for surgery in the case of low bleeding risk. In selected patients at high risk for both bleeding and ischaemic events, when oral antiplatelet therapy withdrawal is required, perioperative treatment with short-acting intravenous glycoprotein IIb/IIIa inhibitors (tirofiban or eptifibatide) should be taken into consideration.

Database: Medline

14. Perioperative management of antiplatelet therapy in patients with a coronary stent who need noncardiac surgery: a systematic review of clinical practice guidelines.

Author(s): Darvish-Kazem, Saeed; Gandhi, Mandark; Marcucci, Maura; Douketis, James D

Source: Chest; Dec 2013; vol. 144 (no. 6); p. 1848-1856

Publication Date: Dec 2013

Publication Type(s): Journal Article Review Systematic Review

PubMedID: 23928727

Available at [Chest](#) - from Free Medical Journals . com



Abstract:BACKGROUND It is unclear how to appropriately manage discontinuation and resumption of antiplatelet therapy in patients with coronary stents who need noncardiac surgery. We undertook a systematic review of the literature to identify practice guideline statements regarding antiplatelet therapy in patients with coronary stents undergoing noncardiac surgery. METHODS We used six search strategies to identify practice guideline statements that comment on perioperative antiplatelet management for patients with coronary stents undergoing noncardiac surgery. Two independent reviewers assessed study eligibility, abstracted data, and completed quality assessment. RESULTS We identified 11 practice guidelines that met the eligibility criteria; these were included in the review. These guidelines advised that elective noncardiac surgery be delayed for at least 4 weeks after bare-metal stent implantation and at least 6 months after drug-eluting stent implantation. For elective surgery, all guidelines advised continuing acetylsalicylic acid (ASA) therapy whenever possible. If interruption of antiplatelet therapy was required, four guidelines advised to discontinue ASA/clopidogrel at least 5 days before surgery, while two guidelines advised to discontinue 7 to 10 days before surgery. Five guidelines provided varying guidance for the use of perioperative bridging during antiplatelet therapy interruption. CONCLUSIONS Most current recommendations are based on expert opinion. This review highlights the need for well-designed prospective studies to identify optimal management strategies in patients with coronary stents who are on antiplatelet therapy and who need noncardiac surgery.

Database: Medline

15. Perioperative management of antiplatelet therapy

Author(s): Oprea A.D.; Popescu W.M.

Source: British Journal of Anaesthesia; Dec 2013; vol. 111

Publication Date: Dec 2013

Publication Type(s): Article



PubMedID: 24335397

Available at [British journal of anaesthesia](#) - from Patricia Bowen Library & Knowledge Service West Middlesex University Hospital NHS Trust (lib302631) Local Print Collection [location] : Patricia Bowen Library and Knowledge Service West Middlesex university Hospital.

Abstract:Worldwide, cardiovascular events represent the major cause of morbidity and mortality. A key role in the pathogenesis of these events is played by platelets. Interventional procedures, with placement of coronary and vascular stents, often represent the preferred therapeutic strategy. Antiplatelet medications are considered first-line therapy in preventing cardiovascular thrombotic events. A wide array of antiplatelet agents is available, each with different pharmacological properties. When patients on antiplatelet agents present for surgery, the perioperative team must design an optimal strategy to manage antiplatelet medications. Each patient is stratified according to risk of developing a cardiovascular thrombotic event and inherent risk of surgical bleeding. After risk stratification analysis, various therapeutic pathways include continuing or discontinuing all antiplatelet agents or maintaining one antiplatelet agent and discontinuing the other. This review focuses on the pharmacological and pharmacokinetic properties of both older and novel antiplatelet drugs, and reviews current literature and guidelines addressing options for perioperative antiplatelet management. © 2013 © The Author [2013]. Published by Oxford University Press on behalf of the British Journal of Anaesthesia. All rights reserved. For Permissions, please email: journals.permissions@oup.com.

Database: EMBASE

16. Perioperative management of anticoagulation in elective surgery

Author(s): Mckenzie J.-L.; Douglas G.; Bazargan A.

Source: ANZ Journal of Surgery; Nov 2013; vol. 83 (no. 11); p. 814-820

Publication Date: Nov 2013

Publication Type(s): Article

PubMedID: 23601136

Available at [ANZ Journal of Surgery](#) - from Wiley Online Library Science , Technology and Medicine Collection 2017

Abstract:Surgeons commonly need to treat patients receiving anticoagulant and anti-platelet therapy. This requires risk assessment and management to balance minimization of bleeding complications and avoidance of further ischaemic or thrombotic events. This review considers the evidence available to guide management of patients on anti-platelet and anticoagulant therapy, including some of the new classes of anti-platelets and anticoagulants which clinicians may be less familiar with. © 2013 Royal Australasian College of Surgeons.

Database: EMBASE

17. The perioperative management of treatment with anticoagulants and platelet aggregation inhibitors.

Author(s): Schlitt, Axel; Jámbor, Csilla; Spannagl, Michael; Gogarten, Wiebke; Schilling, Tom; Zwiessler, Bernhard

Source: Deutsches Arzteblatt international; Aug 2013; vol. 110 (no. 31-32); p. 525-532

Publication Date: Aug 2013

Publication Type(s): Journal Article Review

PubMedID: 24069073

Available at [Deutsches Arzteblatt international](#) - from Europe PubMed Central - Open Access

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Abstract:BACKGROUNDWhen giving anticoagulants and inhibitors of platelet aggregation either prophylactically or therapeutically, physicians face the challenge of protecting patients from thromboembolic events without inducing harmful bleeding. Especially in the perioperative period, the use of these drugs requires a carefully balanced evaluation of their risks and benefits. Moreover, the choice of drug is difficult, because many different substances have been approved for clinical use.METHODWe selectively searched for relevant publications that appeared from 2003 to February 2013, with particular consideration of the guidelines of the European Society of Cardiology, the Association of Scientific Medical Societies in Germany (AWMF), the American College of Cardiology, and the American Heart Association.RESULTSVitamin K antagonists (VKA), low molecular weight heparins, and fondaparinux are the established anticoagulants. The past few years have seen the introduction of orally administered selective inhibitors of the clotting factors IIa (dabigatran) and Xa (rivaroxaban, apixaban). The timing of perioperative interruption of anticoagulation is based on pharmacokinetic considerations rather than on evidence from clinical trials. Recent studies have shown that substituting short-acting anticoagulants for VKA before a procedure increases the risk of bleeding without lowering the risk of periprocedural thromboembolic events. The therapeutic spectrum of acetylsalicylic acid and clopidogrel has been broadened by the newer platelet aggregation inhibitors prasugrel and ticagrelor. Patients with drug eluting stents should be treated with dual platelet inhibition for 12 months because of the risk of in-stent thrombosis.CONCLUSIONAnticoagulants and platelet aggregation inhibitors are commonly used drugs, but the evidence for their perioperative management is limited. The risks of thrombosis and of hemorrhage must be balanced against each other in the individual case. Anticoagulation need not be stopped for minor procedures.

Database: Medline



18. Perioperative handling of antiplatelet drugs. A critical appraisal.

Author(s): Di Minno, Matteo Nicola Dario; Milone, Marco; Mastronardi, Pasquale; Ambrosino, Pasquale; Di Minno, Alessandro; Parolari, Alessandro; Tremoli, Elena; Prisco, Domenico

Source: Current drug targets; Jul 2013; vol. 14 (no. 8); p. 880-888

Publication Date: Jul 2013

Publication Type(s): Journal Article Review

PubMedID: 23627916

Abstract: Because of more and more accurate cardiovascular prevention programs and the increasing mean age of the general population, the use of antiplatelet treatments is progressively increasing in the last years. Moreover, the wide-spread use of bare-metal stents (BMS) and drug-eluting stents (DES) significantly increased the number of subjects with the need of a combined antiplatelet treatment: Aspirin (ASA) and Clopidogrel (CLO). Within the first year after coronary stenting, approximately 5% of patients needs to undergo non-cardiac surgery interventions. In such patients, current guidelines suggest to stop antiplatelet agents 7-10 days before surgery to avoid the risk of increasing blood loss. On the other hand, it has been shown that the risk of surgical bleeding, if antiplatelet drugs are continued, is lower than that of coronary thrombosis if they are withdrawn. Thus, an accurate stratification of the population according to the thrombotic risk is needed and the bleeding and the thrombotic risk should be considered in parallel. Although a growing amount of recommendations have been released by several Societies, the perioperative handling of antiplatelet drugs still represents a major concern in clinical practice. In this review we report the major literature data about the perioperative handling of antiplatelet drugs. Moreover, in order to describe future treatment perspectives and to identify valuable alternatives to current antiplatelet agents in the perioperative period, pharmacokinetic and pharmacodynamic characteristics of newer antiplatelet drugs are reported and analyzed.

Database: Medline



19. Management of severe perioperative bleeding: Guidelines from the European Society of Anaesthesiology

Author(s): Kozek-Langenecker S.A.; Afshari A.; Albaladejo P.; Santullano C.A.A.; De Robertis E.; Filipescu D.C.; Fries D.; Gorlinger K.; Haas T.; Imberger G.; Jacob M.; Lance M.; Llau J.; Mallett S.; Meier J.; Rahe-Meyer N.; Samama C.M.; Smith A.; Solomon C.; Van Der Linden P.; Wikkelsso A.J.; Wouters P.; Wyffels P.

Source: European Journal of Anaesthesiology; Jun 2013; vol. 30 (no. 6); p. 270-382

Publication Date: Jun 2013

Publication Type(s): Article

PubMedID: 23656742

Available at [European Journal of Anaesthesiology](#) - from Ovid (Journals @ Ovid) - London Health Libraries

Available at [European Journal of Anaesthesiology](#) - from Unpaywall

Abstract: The aims of severe perioperative bleeding management are three-fold. First, preoperative identification by anamnesis and laboratory testing of those patients for whom the perioperative bleeding risk may be increased. Second, implementation of strategies for correcting preoperative anaemia and stabilisation of the macro- and microcirculations in order to optimise the patient's tolerance to bleeding. Third, targeted procoagulant interventions to reduce the amount of bleeding, morbidity, mortality and costs. The purpose of these guidelines is to provide an overview of current knowledge on the subject with an assessment of the quality of the evidence in order to allow anaesthetists throughout Europe to integrate this knowledge into daily patient care wherever possible. The Guidelines Committee of the European Society of Anaesthesiology (ESA) formed a task force with members of scientific subcommittees and individual expert members of the ESA. Electronic databases were searched without language restrictions from the year 2000 until 2012. These searches produced 20 664 abstracts. Relevant systematic reviews with meta-analyses, randomised controlled trials, cohort studies, case-control studies and cross-sectional surveys were selected. At the suggestion of the ESA Guideline Committee, the Scottish Intercollegiate Guidelines Network (SIGN) grading system was initially used to assess the level of evidence and to grade recommendations. During the process of guideline development, the official position of the ESA changed to favour the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system. This report includes general recommendations as well as specific recommendations in various fields of surgical interventions. The final draft guideline was posted on the ESA website for four weeks and the link was sent to all ESA members. Comments were collated and the guidelines amended as appropriate. When the final draft was complete, the Guidelines Committee and ESA Board ratified the guidelines. © 2013 Copyright European Society of Anaesthesiology.

Database: EMBASE

20. Dual antiplatelet therapy with aspirin and clopidogrel: what is the risk in noncardiac surgery? A narrative review.

Author(s): Finkel, Jonathan B; Marhefka, Gregory D; Weitz, Howard H

Source: Hospital practice (1995); Feb 2013; vol. 41 (no. 1); p. 79-88

Publication Date: Feb 2013

Publication Type(s): Journal Article Review

PubMedID: 23466970

Abstract: Clopidogrel is one of the most commonly prescribed medications and is currently recommended along with aspirin as treatment to be used for 1 year in all patients without contraindications following an acute coronary syndrome. Patients who are committed to clopidogrel therapy due to recent coronary artery stent implantation may require noncardiac surgery during this recommended period of dual antiplatelet therapy (DAPT). Due to differing rates of endothelialization, patients who undergo bare-metal stent implantation generally require ≥ 1 month of uninterrupted DAPT, and those who undergo drug-eluting stent implantation require ≥ 12 months. Many surgeons ask their patients to stop taking clopidogrel in advance of their procedure to decrease perioperative bleeding. This practice is based largely on anecdotal experience and extrapolated from limited data in cardiac surgery. Premature cessation of aspirin and/or clopidogrel following coronary artery stenting, however, has been associated with acute stent thrombosis, myocardial infarction, and death. We searched PubMed for English language articles published from 1960 to 2012, using the keywords aspirin, clopidogrel, surgery, general, vascular, genitourinary, thoracic, orthopedic, ophthalmologic, dermatologic, endoscopy, colonoscopy, cardiac device implantation, pacemaker, defibrillator, bronchoscopy, bridging, bleeding complications, and transfusion, including various combinations. Articles were reviewed to confirm relevance, and then the full articles were extracted. References from extracted articles were also reviewed for relevant articles. Literature regarding perioperative clopidogrel continuation is predominantly composed of small, nonrandomized data, but suggests that most noncardiac surgeries or procedures can be performed safely while patients are taking clopidogrel. In this article, we review the current best evidence on the risk for bleeding with clopidogrel therapy in noncardiac surgery, summarize recent guidelines on appropriate duration of DAPT, and make recommendations on the management of perioperative DAPT.

Database: Medline



21. Perioperative management of antithrombotic therapy: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines.

Author(s): Douketis, James D; Spyropoulos, Alex C; Spencer, Frederick A; Mayr, Michael; Jaffer, Amir K; Eckman, Mark H; Dunn, Andrew S; Kunz, Regina

Source: Chest; Feb 2012; vol. 141 (no. 2)

Publication Date: Feb 2012

Publication Type(s): Practice Guideline Journal Article

PubMedID: 22315266

Available at [Chest](#) - from Free Medical Journals . com

Available at [Chest](#) - from Unpaywall

Abstract:BACKGROUND This guideline addresses the management of patients who are receiving anticoagulant or antiplatelet therapy and require an elective surgery or procedure. METHOD The methods herein follow those discussed in the Methodology for the Development of Antithrombotic Therapy and Prevention of Thrombosis Guidelines. Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines article of this supplement. RESULTS In patients requiring vitamin K antagonist (VKA) interruption before surgery, we recommend stopping VKAs 5 days before surgery instead of a shorter time before surgery (Grade 1B). In patients with a mechanical heart valve, atrial fibrillation, or VTE at high risk for thromboembolism, we suggest bridging anticoagulation instead of no bridging during VKA interruption (Grade 2C); in patients at low risk, we suggest no bridging instead of bridging (Grade 2C). In patients who require a dental procedure, we suggest continuing VKAs with an oral prohemostatic agent or stopping VKAs 2 to 3 days before the procedure instead of alternative strategies (Grade 2C). In moderate- to high-risk patients who are receiving acetylsalicylic acid (ASA) and require noncardiac surgery, we suggest continuing ASA around the time of surgery instead of stopping ASA 7 to 10 days before surgery (Grade 2C). In patients with a coronary stent who require surgery, we recommend deferring surgery > 6 weeks after bare-metal stent placement and > 6 months after drug-eluting stent placement instead of undertaking surgery within these time periods (Grade 1C); in patients requiring surgery within 6 weeks of bare-metal stent placement or within 6 months of drug-eluting stent placement, we suggest continuing antiplatelet therapy perioperatively instead of stopping therapy 7 to 10 days before surgery (Grade 2C). CONCLUSIONS Perioperative

antithrombotic management is based on risk assessment for thromboembolism and bleeding, and recommended approaches aim to simplify patient management and minimize adverse clinical outcomes.

Database: Medline

22. Safety and efficacy of clopidogrel before surgery

Author(s): Yasuda H.

Source: Clinical Medicine Insights: Therapeutics; 2011; vol. 3 ; p. 103-111

Publication Date: 2011

Publication Type(s): Review

Available at [Clinical Medicine Insights: Therapeutics](#) - from Unpaywall

Abstract: Clopidogrel is an antiplatelet drug that is used in patients who have had previous cerebrovascular events, acute coronary syndromes, or who underwent percutaneous coronary interventions (PCI) with bare metal or drug-eluting stents. About 5% of patients who undergo PCI have to undergo non-cardiac surgery within 1 year of coronary stent implantation. Patients who receive clopidogrel may be at increased risk of bleeding complications during surgery. The risk of coronary thrombosis after non-cardiac surgery increases, especially when surgery is performed early after stenting, and particularly when antiplatelet agents are withdrawn before surgery. The decision to continue or withhold clopidogrel should reflect a balance of the consequences of perioperative hemorrhage versus the risk of perioperative vascular complications. Close communication among surgeons, anesthesiologists, and cardiologist is necessary to minimize both adverse cardiac risk and surgical risk in those patients. © the author(s).

Database: EMBASE



23. Non-cardiac surgery in patients with coronary stents: the RECO study.

Author(s): Albaladejo, Pierre; Marret, Emmanuel; Samama, Charles-Marc; Collet, Jean-Philippe; Abhay, Kou; Loutrel, Olivier; Charbonneau, H      ; Jaber, Samir; Thoret, Sophie; Bosson, Jean-Luc; Piriou, Vincent

Source: Heart (British Cardiac Society); Oct 2011; vol. 97 (no. 19); p. 1566-1572

Publication Date: Oct 2011

Publication Type(s): Research Support, Non-u.s. Gov't Multicenter Study Journal Article

PubMedID: 21791513

Available at [Heart \(British Cardiac Society\)](#) - from BMJ Journals - NHS

Available at [Heart \(British Cardiac Society\)](#) - from Free Medical Journals . com

Available at [Heart \(British Cardiac Society\)](#) - from ProQuest (Health Research Premium) - NHS Version

Abstract:CONTEXT Interruption or maintenance of oral antiplatelet therapy (OAT) during an invasive procedure may result in ischaemic and/or haemorrhagic complications. There is currently a lack of clear guidance regarding the issue of treatment interruption during surgical procedures.OBJECTIVE To evaluate the rate of major adverse cardiac and cerebrovascular events (MACCEs) and major or minor bleeding complications and their associated independent correlates in coronary stented patients undergoing urgent or planned non-cardiac surgery.DESIGN, SETTING, AND PATIENTS Prospective, multicentre, observational cohort study of 1134 consecutive patients with coronary stents.MAIN OUTCOME MEASURE The co-primary endpoints consisted of the incidence of MACCE and major bleeding within the first 30 days of an invasive procedure.RESULTS MACCE and



haemorrhagic complications were observed in 124 (10.9%) and 108 (9.5%) patients, respectively, within an average time delay from invasive procedure to event of 3.3 ± 3.9 and 5.3 ± 5.3 days. Independent preoperative correlates for MACCE were complete OAT interruption for more than 5 days prior to surgery, preoperative haemoglobin <10 g/dl, creatinine clearance of <30 ml/min and emergency or high-risk surgery. Independent factors for haemorrhagic complications were preoperative haemoglobin <10 g/dl, creatinine clearance between 30 and 60 ml/min, a delay from stent implantation to surgery <3 months and high-risk surgery according to the Lee classification. CONCLUSIONS Patients with coronary stents undergoing an invasive procedure are at high risk of perioperative myocardial infarction including stent thrombosis irrespective of the stent type and major bleeding. Interruption of OAT more than 5 days prior to an invasive procedure is a key player for MACCE. CLINICAL TRIAL REGISTRATION NCT01045850.

Database: Medline

24. Peri-operative management of antiplatelet therapy in patients with coronary artery disease: joint position paper by members of the working group on Perioperative Haemostasis of the Society on Thrombosis and Haemostasis Research (GTH), the working group on Perioperative Coagulation of the Austrian Society for Anesthesiology, Resuscitation and Intensive Care (ÖGARI) and the Working Group Thrombosis of the European Society for Cardiology (ESC).

Author(s): Korte, W; Cattaneo, M; Chassot, P-G; Eichinger, S; von Heymann, C; Hofmann, N; Rickli, H; Spannagl, M; Ziegler, B; Verheugt, F; Huber, K

Source: Thrombosis and haemostasis; May 2011; vol. 105 (no. 5); p. 743-749

Publication Date: May 2011

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article Consensus Development Conference

PubMedID: 21437351

Abstract: An increasing number of patients suffering from cardiovascular disease, especially coronary artery disease (CAD), are treated with aspirin and/or clopidogrel for the prevention of major adverse events. Unfortunately, there are no specific, widely accepted recommendations for the perioperative management of patients receiving antiplatelet therapy. Therefore, members of the Perioperative Haemostasis Group of the Society on Thrombosis and Haemostasis Research (GTH), the Perioperative Coagulation Group of the Austrian Society for Anesthesiology, Reanimation and



Intensive Care (ÖGARI) and the Working Group Thrombosis of the European Society of Cardiology (ESC) have created this consensus position paper to provide clear recommendations on the perioperative use of anti-platelet agents (specifically with semi-urgent and urgent surgery), strongly supporting a multidisciplinary approach to optimize the treatment of individual patients with coronary artery disease who need major cardiac and non-cardiac surgery. With planned surgery, drug eluting stents (DES) should not be used unless surgery can be delayed for ≥ 12 months after DES implantation. If surgery cannot be delayed, surgical revascularisation, bare-metal stents or pure balloon angioplasty should be considered. During ongoing antiplatelet therapy, elective surgery should be delayed for the recommended duration of treatment. In patients with semi-urgent surgery, the decision to prematurely stop one or both antiplatelet agents (at least 5 days pre-operatively) has to be taken after multidisciplinary consultation, evaluating the individual thrombotic and bleeding risk. Urgently needed surgery has to take place under full antiplatelet therapy despite the increased bleeding risk. A multidisciplinary approach for optimal antithrombotic and haemostatic patient management is thus mandatory.

Database: Medline

25. Cessation of clopidogrel before major abdominal procedures.

Author(s): Chernoguz, Artur; Telem, Dana A; Chu, Edward; Ozao-Choy, Junko; Tammara, Yolanda; Divino, Celia M

Source: Archives of surgery (Chicago, Ill. : 1960); Mar 2011; vol. 146 (no. 3); p. 334-339

Publication Date: Mar 2011

Publication Type(s): Comparative Study Journal Article

PubMedID: 21422366

Available at [Archives of surgery \(Chicago, Ill. : 1960\)](#) - from American Medical Association Athens - NHS

Available at [Archives of surgery \(Chicago, Ill. : 1960\)](#) - from Free Medical Journals . com



Available at [Archives of surgery \(Chicago, Ill. : 1960\)](#) - from Unpaywall

Abstract:OBJECTIVETo determine whether timing of clopidogrel bisulfate cessation influences outcome after abdominal operations.METHODSA review was performed of 104 patients receiving clopidogrel who underwent abdominal operations between March 2003 and March 2009. Patients were grouped by last clopidogrel use: group A (<7 days) and group B (≥7 days).RESULTSOf 104 patients, 43 were in group A and 61 were in group B. Overall, 6 deaths occurred (group A, 5 patients [12%] vs group B, 1 [2%]; $P = .03$) and 27 patients required intensive care unit admission (group A, 16 patients [37%] vs group B, 11 [18%]; $P = .03$). Twenty-one patients developed a postoperative bleeding complication; 19 complications were managed by blood transfusion and 2 required reoperation. Group A vs group B had significantly increased rates of postoperative bleeding requiring blood transfusion (13 patients [30%] vs 8 [13%]; $P = .03$). No significant difference in postoperative bleeding resulting in reoperation or mortality was demonstrated. Timing of clopidogrel cessation within 7 days did not affect postoperative bleeding risk. Eighty-nine patients (86%) underwent elective operations (group A, 30 patients [70%] vs group B, 59 [97%]; $P < .001$). While elective patients in group A vs those in group B demonstrated a trend toward increased risk of postoperative bleeding requiring transfusion (7 patients [23%] vs 8 [14%]; $P = .25$), no significant difference in intensive care unit admission (group A, 6 patients [20%] vs group B, 9 [15%]; $P = .31$) or mortality (1 [3%] vs 1 [2%]; $P = .62$) was demonstrated.CONCLUSIONSWhile clopidogrel use within 7 days of an operation significantly increased the risk of postoperative bleeding, most bleeding episodes were successfully managed by transfusion without an increase in bleeding-related mortality or necessity for reoperation. After controlling for operative urgency, no significant difference in mortality or intensive care unit admission was demonstrated in patients undergoing elective procedures. High-risk patients undergoing elective operations may not require preoperative clopidogrel cessation. When clopidogrel cessation is warranted, 7 days before the procedure is recommended. Perioperative risk does not vary by timing of cessation within 7 days of an operation.

Database: Medline

26. Anticoagulant and antithrombotic drugs in pregnancy: What are the anesthetic implications for labor and cesarean delivery

Author(s): Butwick A.J.; Carvalho B.

Source: Journal of Perinatology; Feb 2011; vol. 31 (no. 2); p. 73-84

Publication Date: Feb 2011

Publication Type(s): Article

PubMedID: 20559281

Available at [Journal of Perinatology](#) - from ProQuest (Health Research Premium) - NHS Version



Available at [Journal of Perinatology](#) - from Unpaywall

Abstract: Neuraxial anesthetic techniques are commonly used during the peripartum period to provide effective pain relief for labor and anesthesia during cesarean delivery. Major neurologic complications are rare after neuraxial anesthesia; however, spinal hematoma is associated with catastrophic neurologic outcomes (including lower-limb paralysis). Anticoagulant and antithrombotic drugs can increase the risk of spinal hematoma after neuraxial anesthesia, and better understanding of the pharmacokinetics and pharmacodynamics of anticoagulants has led to greater appreciation for withholding anticoagulation before and after neuraxial anesthesia. A number of national anesthetic societies have produced guidelines for performing neuraxial anesthesia in patients receiving anticoagulation. However, there is limited information about anesthetic implications of anticoagulation during the peripartum period. This article will review the risks of spinal hematoma after neuraxial anesthesia in pregnant patients; current guidelines for neuraxial anesthesia for anticoagulated patients; and relevant pharmacological data of specific anticoagulant and antithrombotic drugs in pregnancy. © 2011 Nature America, Inc. All rights reserved.

Database: EMBASE

27. Guidelines for the management of antiplatelet therapy in patients with coronary stents undergoing non-cardiac surgery.

Author(s): Cardiac Society of Australia and New Zealand

Source: Heart, lung & circulation; Jan 2010; vol. 19 (no. 1); p. 2-10

Publication Date: Jan 2010

Publication Type(s): Practice Guideline Journal Article

PubMedID: 20045378

Database: Medline

28. Perioperative handling of patients on antiplatelet therapy with need for surgery.

Author(s): Di Minno, Matteo Nicola Dario; Prisco, Domenico; Ruocco, Anna Lilia; Mastronardi, Pasquale; Massa, Salvatore; Di Minno, Giovanni

Source: Internal and emergency medicine; Aug 2009; vol. 4 (no. 4); p. 279-288

Publication Date: Aug 2009



Publication Type(s): Journal Article

PubMedID: 19533288

Available at [Internal and emergency medicine](#) - from SpringerLink - Medicine

Available at [Internal and emergency medicine](#) - from ProQuest (Health Research Premium) - NHS Version

Abstract: The widespread use of metal stents and drug-eluting stents has shown the extent to which patients with unstable coronary perfusion depend on antiplatelet drugs, and how their risk of late thrombosis depends on the long-term use of agents such as clopidogrel. It has also been shown that the risk of surgical bleeding, if antiplatelet drugs are continued, is lower than that of coronary thrombosis if they are withdrawn. Thus, except for low-risk settings, the practice of withdrawing antiplatelet drugs 5-10 days prior to surgical procedures should be changed. The following suggestions are meant to provide a guideline in this respect. Most of the current surgical procedures may be performed while on low-dose aspirin treatment. Except when bleeding may occur in closed spaces (e.g. intracranial surgery, spinal surgery in the medullary canal, surgery of the posterior chamber of the eye) or where excessive blood loss is expected, where only clopidogrel should be discontinued; in all other cases the surgical procedures should be carried out in the presence of dual antiplatelet agents (if prescribed). Aspirin may be discontinued only in subjects at low risk of thrombosis, and at high risk of intraoperative bleeding. Operations associated with an expected excessive blood loss should be postponed unless vital. When prescribed for acute coronary syndrome or during stent re-endothelialization, clopidogrel should not be discontinued before a noncardiac procedure. For elective procedures, surgery should be postponed until the end of the indication for clopidogrel. After the operation, clopidogrel should be resumed within the 12-24 h. Cardiac procedures should be postponed for at least 4 days after clopidogrel withdrawal. The thrombotic risk of preoperative withdrawal of antiplatelet drugs overwhelms the benefit of regional or neuraxial blockade. Antiplatelet treatment replacement by heparin or low-molecular weight heparin does not provide protection against the risk of coronary artery or stent thrombosis. Haemostasis requires that at least 20% of circulating platelets have a normal function. As the effects of antiplatelet agents are not reversible by other drugs, fresh platelets are the only manner to rapidly restore normal haemostasis. Aprotinin decreases postoperative bleeding and transfusion rates in patients undergoing CABG and on clopidogrel during the days preceding surgery.

Database: Medline



Strategy 674476

#	Database	Search term	Results
1	Medline	exp CLOPIDOGREL/	8359
2	Medline	(clopidogrel).ti,ab	11666
3	Medline	(1 OR 2)	13385
4	Medline	((obstetric OR intrapartum OR postpartum) ADJ2 (hemorrhag* OR haemorrhag*)).ti,ab	6211
5	Medline	exp "POSTPARTUM HEMORRHAGE"/	6673
6	Medline	(4 OR 5)	9447
7	Medline	(3 AND 6)	0
8	EMBASE	exp CLOPIDOGREL/	56629
9	EMBASE	(clopidogrel).ti,ab	22150
10	EMBASE	(8 OR 9)	0
11	EMBASE	((obstetric OR intrapartum OR postpartum) ADJ2 (hemorrhag* OR haemorrhag*)).ti,ab	9191
12	EMBASE	exp "POSTPARTUM HEMORRHAGE"/	12700
13	EMBASE	(11 OR 12)	14878
15	EMBASE	(8 OR 9)	57998
16	EMBASE	(13 AND 15)	17
17	EMBASE	exp "OPERATIVE	19209



		HAEMORRHAGE"/	
18	EMBASE	((perioperative OR operative OR intraoperative) ADJ2 (haemorrhag* OR hemorrhag* OR "blood loss" OR bleeding)).ti,ab	26586
19	EMBASE	(17 OR 18)	38820
20	EMBASE	*CLOPIDOGREL/	10757
21	EMBASE	(19 AND 20)	156
22	EMBASE	exp "INSTRUMENTAL DELIVERY"/ OR exp "CESAREAN SECTION"/	94514
23	EMBASE	(20 AND 22)	4
24	EMBASE	exp "OBSTETRIC DELIVERY"/	136400
25	EMBASE	(20 AND 24)	6
26	EMBASE	exp "OBSTETRIC HEMORRHAGE"/	15629
27	EMBASE	(20 AND 26)	2
28	EMBASE	*"ANTITHROMBOCYTIC AGENT"/	11480
29	EMBASE	(26 AND 28)	2
30	EMBASE	(13 AND 28)	2
31	EMBASE	exp "ANTITHROMBOCYTIC AGENT"/	330802
32	EMBASE	(26 AND 31)	252



33	EMBASE	(antiplatelet*).ti,ab	41774
34	EMBASE	(26 AND 33)	32
35	Medline	exp "DELIVERY, OBSTETRIC"/	76450
36	Medline	(3 AND 35)	7
37	Medline	((perioperative OR postoperative OR operative OR intraoperative) ADJ2 (haemorrhag* OR hemorrhag* OR "blood loss" OR bleeding)).ti,ab	28927
38	Medline	exp "POSTOPERATIVE HEMORRHAGE"/	10425
39	Medline	(37 OR 38)	36306
40	Medline	(3 AND 39)	449
41	Medline	(abdom* ADJ2 surg*).ti,ab	23096
42	Medline	(3 AND 41)	9
43	Medline	("non cardiac" OR noncardiac).ti,ab	10864
44	Medline	(3 AND 43)	100
45	EMBASE	exp "OBSTETRIC PATIENT"/	1658
46	EMBASE	(10 AND 45)	5
47	EMBASE	(noncardiac OR "non cardiac").ti,ab	16788
48	EMBASE	(15 AND 47)	521
49	EMBASE	(20 AND 47)	36



50	EMBASE	exp "GENERAL SURGERY"/	14020
51	EMBASE	(20 AND 50)	6
52	EMBASE	exp "ABDOMINAL SURGERY"/	728089
53	EMBASE	(20 AND 52)	98
54	EMBASE	exp "OBSTETRIC OPERATION"/	145302
55	EMBASE	(15 AND 54)	105
56	Medline	(antiplatelet* OR "anti platelet*").ti,ab	28903
57	Medline	(6 AND 56)	10
58	Medline	(35 AND 56)	25
59	EMBASE	(antiplatelet* OR "anti platelet*").ti,ab	48770
60	EMBASE	(22 AND 59)	93
61	EMBASE	exp "DUAL ANTIPLATELET THERAPY"/	4798
62	EMBASE	(54 AND 61)	8
63	EMBASE	(13 AND 61)	1
64	EMBASE	(8 AND 17)	220
65	Medline	exp "TIME FACTORS"/	1153379
66	Medline	exp "SURGICAL PROCEDURES, OPERATIVE"/	3008843
67	Medline	(3 AND 65 AND 66)	928



68	Medline	(39 AND 67)	74
69	Medline	(switch*).ti,ab	151988
70	Medline	(3 AND 39 AND 69)	3
71	EMBASE	exp "TIME FACTOR"/	27539
72	EMBASE	(10 AND 19 AND 71)	0
73	EMBASE	(cessation).ti,ab	91769
74	EMBASE	(10 AND 19 AND 73)	25
75	EMBASE	(24 AND 33)	91
76	EMBASE	exp "ANTITHROMBOCYTIC AGENT"/	331234
77	EMBASE	(19 AND 24 AND 76)	17
78	EMBASE	(interrup*).ti,ab	88881
79	EMBASE	(13 AND 76 AND 78)	0
80	EMBASE	(19 AND 76 AND 78)	64
81	EMBASE	(bridging).ti,ab	36493
82	EMBASE	(19 AND 76 AND 81)	42
83	Medline	(interrup*).ti,ab	66532
84	Medline	(bridging).ti,ab	33804
85	Medline	(83 OR 84)	99980
86	Medline	exp "PLATELET AGGREGATION INHIBITORS"/	120312



87	Medline	(39 AND 85 AND 86)	102
88	Medline	(6 AND 85 AND 86)	0