

Thyroid Surgery and Anticoagulation: Survey of Practice of Endocrine Surgeons in Australia

Kunal Pradip Verma, Alexandra Gorelik, Julie Ann Miller

ABSTRACT

Few studies specifically address management of venous thromboembolism (VTE) prophylaxis and bridging anti-coagulation therapy in patients undergoing thyroid surgery. A survey about perioperative management of thromboprophylaxis was sent to Australian Endocrine Surgeons. Responses were tabulated and graphed; a p-value of < 0.05 was considered statistically significant. Survey responses showed a large broad spectrum of practice regarding thromboprophylaxis, bridging therapy and cessation of anticoagulant medication. While anticoagulant prophylaxis in thyroid surgery appears to be relatively safe, there is a theoretical risk of catastrophic bleeding complications; according to this survey of Australian Endocrine Surgeons, thromboembolic events are uncommon complications of thyroid surgery.

Keywords: Anticoagulation, Complications, Prophylaxis, Thyroid surgery.

How to cite this article: Verma KP, Gorelik A, Miller JA. Thyroid Surgery and Anticoagulation: Survey of Practice of Endocrine Surgeons in Australia. *World J Endoc Surg* 2013;5(1):6-11.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Thromboembolism is an important surgical complication; there have been several risk factors identified, including previous history of thromboembolism, hip or leg fractures, hip or knee replacement surgery, major abdominal operations, postoperative infections, major trauma, thrombophilia, inflammatory bowel disease, immobilization for more than 72 hours, use of hormonal contraceptives and cancer.

Prevention strategies for thromboembolism include both nonpharmacologic (compression stockings, pneumatic intermittent compression devices) and pharmacologic interventions. Pharmacologic perioperative thromboprophylaxis [unfractionated (UFH) or low molecular weight heparin (LMWH)] can reduce the risk of these complications, but at the potential cost of increased bleeding risk. Thyroid surgery represents a situation where relatively low-volume bleeding can be disastrous for patient outcome, potentially causing airway compromise and death. There is a large literature base regarding the risks and benefits of perioperative thromboprophylaxis and the need for bridging therapy in patients whose anticoagulant medications are

ceased in preparation for elective surgery.¹⁻⁷ Most publications address high risk groups, such as trauma, orthopedic, and oncologic surgical patients, or patients already anticoagulated for previous thromboembolic events. Australian guidelines regarding perioperative thromboprophylaxis provide general recommendations only and do not address thyroid surgery specifically.^{8,9} During preparation of the manuscript, an excellent study regarding the risks of VTE and reoperation for bleeding in patients undergoing thyroid and parathyroid surgery was published by Roy et al,¹⁰ but this data was not available when the survey was performed. The purpose of this survey was to ascertain the current practices of experienced Endocrine Surgeons in Australia regarding their use of perioperative thromboprophylaxis for venous and arterial thromboembolism.

MATERIALS AND METHODS

A multiple choice survey was designed and sent via email or post to all active members of Australian Endocrine Surgeons. All surgeons were Fellows of the Royal Australasian College of Surgeons (FRACS). Survey questions gathered information regarding thyroid surgery experience and current practices regarding anticoagulation management before and after elective thyroid surgery. Surgeons were asked how many thyroidectomies they performed in an average month and were classified as low volume if they performed on average 0 to 1, moderate volume if they performed 2 to 5, high volume for 6 to 10, and very high volume for >10 thyroidectomies per month. Other questions included indications for, nature of, and timing of deep vein thrombosis (DVT) chemoprophylaxis, and the perioperative management of patients already on anticoagulant medication. Surgeons were asked how many thyroid surgery patients they recall suffering DVT or pulmonary embolism (PE) within 6 weeks of surgery. The complete survey is attached (Appendix 1). Answers were tabulated using Microsoft Excel 2003. Data was analyzed using Stata 10 (StataCorp, College Station, TX, USA). The correlation between surgeon's responses and their volume categorization was investigated using Fisher's exact test, with a p-value <0.05 considered statistically significant.

Appendix 1: Survey distributed to Australian Endocrine Surgeons

Please tick the boxes that apply:

- When do you prescribe DVT prophylaxis in elective thyroid surgery?
 - Always
 - In patients with any DVT risk factors
 - Only in high-risk patients
 - Never
- How do you prescribe DVT prophylaxis?
 - Unfractionated heparin preoperative
 - Unfractionated heparin postoperative
 - LMW heparin preoperative (i.e. enoxaparin)
 - LMW heparin postoperative (i.e. enoxaparin)
- Please tick any of the following medications you would instruct the patient to cease prior to elective thyroid surgery
 - Ibuprofen or other NSAIDs
 - Aspirin
 - Clopidogrel (Plavix/iscover)
 - Warfarin
- If you cease warfarin, would you prescribe LMWH bridging therapy?
 - If the warfarin is for atrial fibrillation without TIA or stroke
 - If the warfarin is for atrial fibrillation with TIA or stroke
 - If the warfarin is for DVT or PE
 - If the warfarin is for a mechanical heart valve
 - If the warfarin is for peripheral vascular disease or dilated cardiomyopathy
 - Never
- If your patient is on LMWH prior to thyroid surgery, when would you give the last dose?
 - On the morning of surgery
 - 12 hours before
 - 24 hours before
 - 36 hours before
- What is the lowest INR for which you would cancel an elective thyroidectomy?
 - 1.3
 - 1.4
 - 1.5
 - 1.6
 - 1.7
 - 1.8
 - 2.0
 - 2.2
 - I would give FFP and operate anyway
 - I would operate anyway and give FFP if required
- After thyroidectomy, when are you comfortable restarting the following medications?

	Day 1	Day 2	Day 3	Day 4
Aspirin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clopidogrel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Warfarin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- How many thyroidectomies do you perform in an average month?
 - 0-1
 - 2-5
 - 6-10
 - >10
- Approximately, how many thyroidectomies have you done in your career?
- How many post-thyroidectomy DVTs can you recall?
- How many post-thyroidectomy PEs can you recall? Any fatal?

RESULTS

Sixty-seven surveys were sent via e-mail and post. Fifty-seven of 67 surgeons responded (85% response rate). Eight of 57 surgeons (14%) were low volume surgeons, 15 (26%) moderate volume, 13 (23%) high volume, and 21 (37%) very high volume (Graph 1).

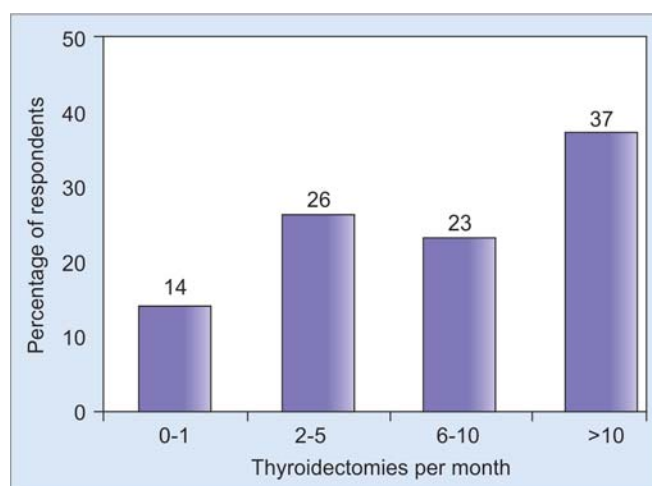
Graphs 1 to 9 detail surgeons' responses to Questions 1 to 9 respectively. Table 1 details the cumulative recollection of survey respondents of DVTs, PEs and fatal PEs within 6 weeks after thyroid surgery.

Twenty-five percent of respondents always prescribed VTE prophylaxis, while 26 and 46% prescribed it for minor and major risk factors, respectively (Graph 1). Ninety-five percent of respondents reported that they would instruct patients to cease warfarin and clopidogrel prior to elective thyroid surgery, while 51 and 58% of respondents were comfortable with patients continuing to take nonsteroidal medications and aspirin respectively, prior to thyroidectomy (Graph 3).

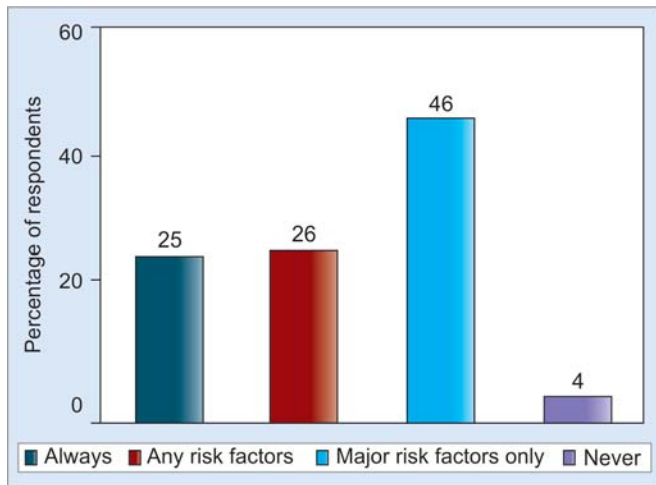
Three quarters of surgeons prescribe bridging LMWH for atrial fibrillation (AF) with a past history of stroke or transient ischemic attack, and more than 90% in patients with cardiac valve replacements, in contrast to 14% of surgeons for patients with AF without embolic events. Four percent of surgeons would never prescribe bridging LMWH regardless of the patient's past history (Graph 4).

For patients on bridging LMWH, most surgeons were comfortable with patients receiving the last dose 12 to 24 hours prior to surgery. However, 9% of surgeons would give the last dose on the day of surgery, while 2% of surgeons would withhold LMWH 36 hours or more prior to surgery (Graph 5).

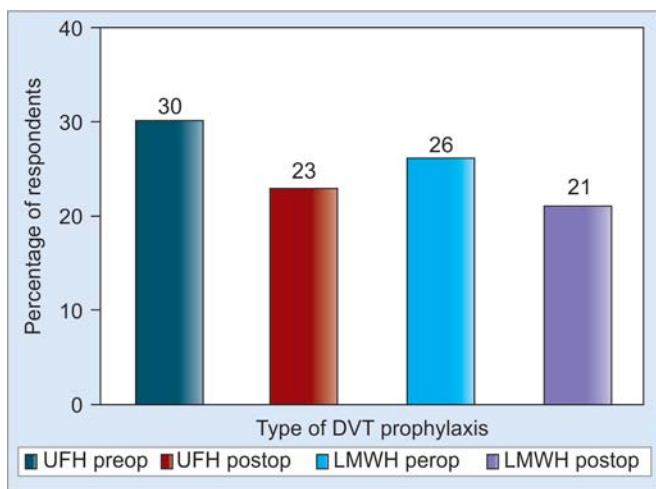
For patients on warfarin, 77% of surgeons were comfortable operating provided the international normalized



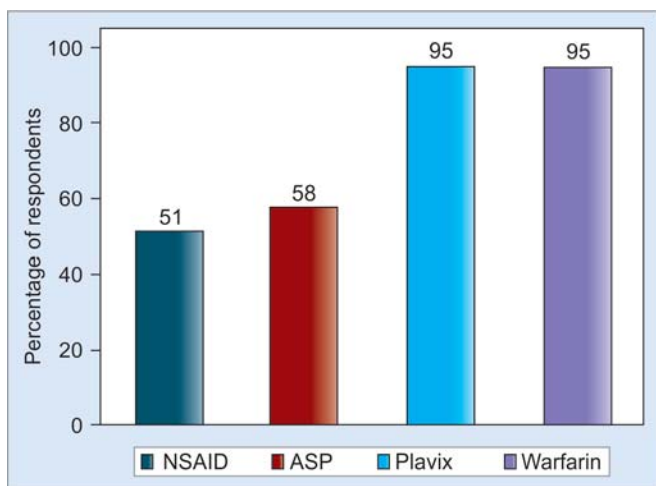
Graph 1: Surgeon categorization by volume of thyroidectomies performed



Graph 2: When do you prescribe DVT prophylaxis in elective thyroid surgery?



Graph 3: How do you prescribe DVT prophylaxis? UFH preop: Unfractionated heparin preoperatively; UFH postop: Unfractionated heparin postoperatively; LMWH preop: Low molecular weight heparin preoperatively; LMWH postop: Low molecular weight heparin postoperatively



Graph 4: Which of the following medications would you instruct patients to cease prior to thyroid surgery? NSAID: Non-steroidal anti-inflammatory drugs; ASP: Aspirin; Plavix: Clopidogrel

ratio (INR) was <1.5 (normal range: 0.8-1.2). A small proportion (4%) of surgeons would operate no matter what the INR and give fresh frozen plasma either empirically or as needed during surgery (Graph 6).

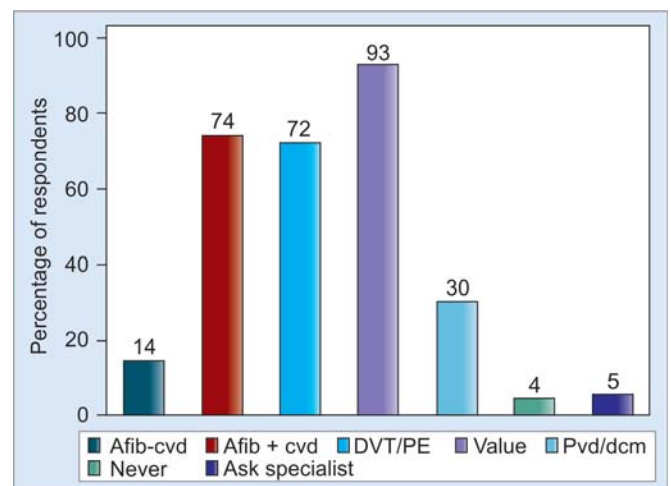
Surgeons were not as comfortable restarting clopidogrel early as compared with warfarin or aspirin; 33% would restart clopidogrel on postoperative day 1 as opposed to 41% of surgeons for warfarin and 54% for aspirin (Graph 7).

High/very high volume surgeons restarted warfarin ($p = 0.03$) and clopidogrel ($p < 0.01$) earlier than low/moderate volume surgeons (Graphs 8 and 9). For all other questions, there was no significant difference in responses based on the volume of thyroid surgery performed by the treating surgeon.

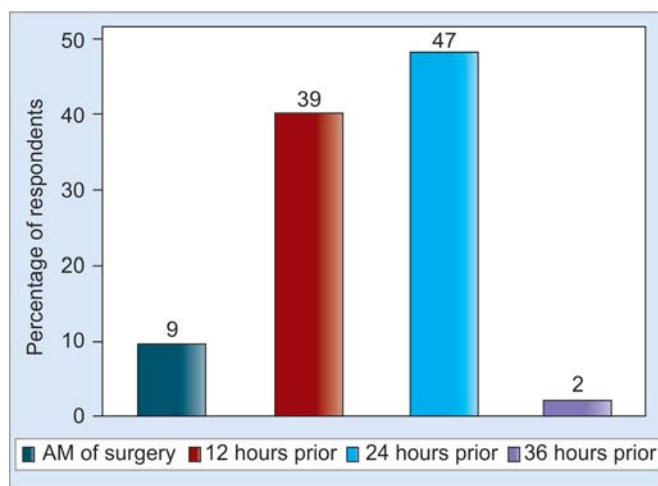
From a total 55,893 thyroidectomies performed by respondents, they could collectively recall only 23 DVTs and 14 PEs, none of which were reported to be fatal (Table 1).

DISCUSSION

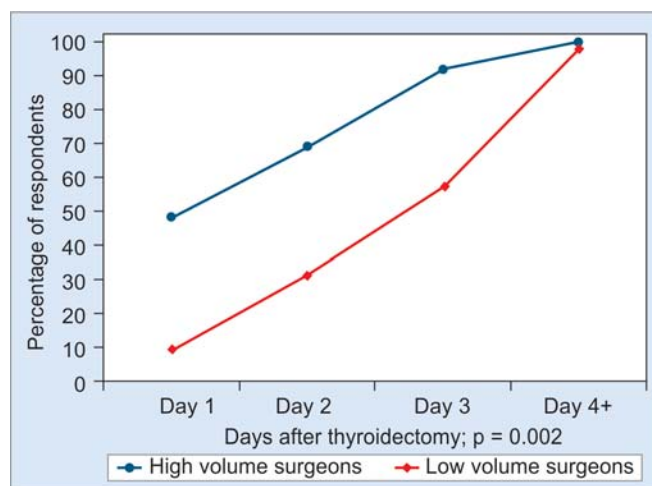
There are Australian Best Practice Guidelines available which provide risk stratification guidance for surgical patients with regards to VTE prophylaxis.^{8,9} However, these guidelines do not specifically address the risks associated with thyroid surgery, or provide clear recommendations regarding VTE prophylaxis for thyroid surgery. Roy et al have recently published the first study specifically evaluating VTE risk in thyroid surgery patients.¹⁰ Their review of DVT/PE rates in 347,862 patients who underwent any surgical procedure compared with 16,022 patients who underwent thyroid/parathyroid surgery in the same time period found that thyroid/parathyroid surgery patients had one-sixth the incidence of DVT/PE of the overall group of



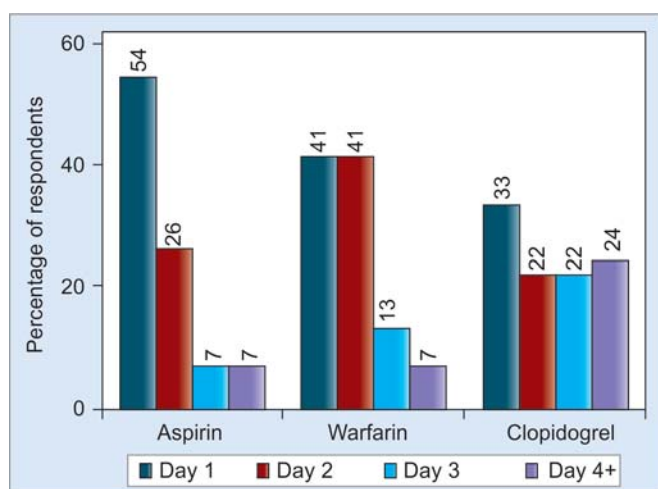
Graph 5: If you cease warfarin, when would you prescribe LMWH bridging therapy? Afib-cvd: Atrial fibrillation without history of cerebrovascular disease; Afib+cvd: Atrial fibrillation with a history of cerebrovascular disease; Pvd/dcm: Peripheral vascular disease/dilated cardiomyopathy



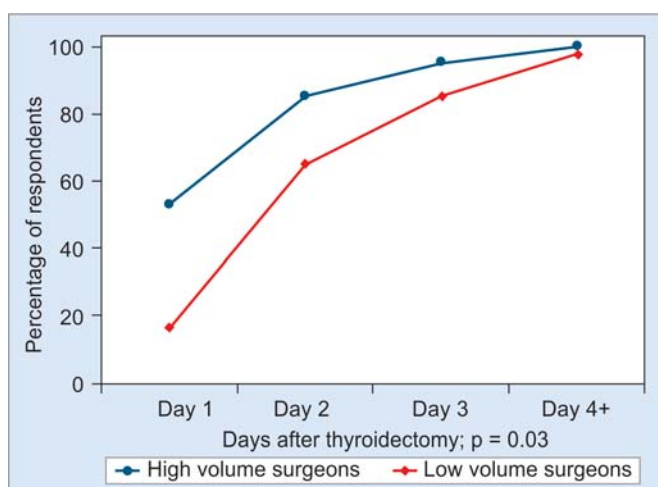
Graph 6: If your patient is on LMWH prior to thyroid surgery, when would you give the last dose?



Graph 9: Low/moderate vs high/very high volume surgeons with regards to restarting clopidogrel



Graph 7: After thyroidectomy, when are you comfortable for restarting the following medications?



Graph 8: Low/moderate vs high/very high volume surgeons with regards to restarting warfarin

surgical patients. The VTE prevention guidelines produced by the National Clinical Guideline Centre in the UK reports the incidence of symptomatic VTE in head and neck surgery

to be 0.02% during 2003/04, which is the lowest incidence among all categories of procedures.¹¹ Similarly, White et al (2003)¹² reported the risk of VTE in patients without malignancy to be lowest in head and neck surgery among all categories of surgery.

The VTE prevention guidelines produced by the Australia and New Zealand Working Party on the management and prevention of venous thromboembolism (VTE)⁹ defines surgical patients <40 years of age having surgery <45 minutes in duration as the group of patients with the lowest risk of VTE. However, thyroid surgery patients do not always fall into the lowest risk group according to these guidelines, as many patients are older than 40 years of age and surgery often takes longer than 45 minutes.

Currently there is ongoing debate as to the relative efficacy of preoperative vs postoperative initiation of VTE prophylaxis. Evidence is available in support of both preoperative and postoperative initiation, but almost all studies and meta-analyses are directed specifically toward major orthopedic procedures.¹³⁻¹⁵ Evidence for which approach is appropriate in thyroid surgery patients is to our knowledge nonexistent. Our survey found that 44% of surgeons give prophylaxis postoperatively. This may be explained by the uncommon yet devastating possibility of postoperative hemorrhage leading to airway compromise; perhaps endocrine surgeons feel more comfortable with the ability to withhold anticoagulation, if there are any doubts regarding hemostasis at the end of the procedure. Indeed, Roy et al¹⁰ found that the risk of postoperative bleeding necessitating a return to theatre was 10-fold the risk of VTE. They suggest that in thyroid/parathyroid surgery, the risk of bleeding complications may significantly outweigh the risk of VTE complications.

Table 1: Cumulative recollection of survey respondents of DVTs, PEs, and fatal PEs within 6 weeks after thyroid surgery

Complication	Number of events	% of total number of thyroidectomies
DVTs	23	0.041
PEs	14	0.025
Fatal PEs	0	0

With the exception of Question 7, the responses were similar regardless of the volume of thyroid surgery performed, but all respondents were surgeons with a specific interest in endocrine surgery. It is important to note that many of the low-volume surgeons will have trained in high-volume centers. The observation that high and very high volume surgeons restart warfarin and clopidogrel earlier than low and moderate volume surgeons may reflect more confidence with operative hemostasis, or a better understanding of the pharmacology of these drugs.

Drawbacks of our methodology include selection bias associated with surveying only Australian Endocrine Surgeons, as there would be numerous general surgeons in Australia performing thyroidectomies without being members of the AES. Further, we do not have accurate data pertaining to the rate of postoperative hemorrhage, or the number of cases that were greater than 45 minutes in duration (classifying them as higher risk procedures).⁹ The surveyed surgeons reported an extremely low rate of VTE complications (0.07% in comparison to 0.16% for a combined thyroidectomy/parathyroidectomy patient group reported by Roy et al).¹⁰ An obvious weakness of this result is that it depends on surgeons' memories of previous complications. In addition, some patients with thromboembolic complications may present to their local medical practitioner, rather than back to their surgeon. As a result, the rate of thromboembolic complication is likely underestimated. However, despite this caveat, it is likely surgeons would remember any clinically significant, and especially fatal PE's.

With regards to preoperative cessation of medications, our survey lacked questions regarding when antiplatelet, anticoagulant and anti-inflammatory medication should be ceased. There is lack of consensus regarding the perioperative management of antiplatelet therapy, with a recent joint position paper from Europe¹⁶ concluding that the decision to cease antiplatelet therapy 5 days prior to surgery needs to be taken after multidisciplinary consultation to assess the patient's specific risk factors for thrombosis and bleeding. Our results show that there is a wide range of practice amongst our respondents with regards to initiation of antiplatelet and anticoagulant therapy postoperatively; this may be a reflection of this lack of consensus.

CONCLUSION

Elective thyroid surgery appears to carry a relatively low risk of thromboembolic complications. While anticoagulant prophylaxis appears to be safe, there is a small but real risk of catastrophic bleeding complications. As there is a lack of robust data on the topic, practice is likely to continue to vary widely among experienced specialist endocrine surgeons. We recommend that surgeons continue to assess the risk/benefit ratio for each patient on a case-by-case basis. The pertinent factors to consider include the age of the patient, and a history of:

- Cancer
- Thrombotic events
- Bleeding tendency and
- The patient's indication for anticoagulation/antiplatelet therapy.

Other important considerations include the expected difficulty, time course of the operation given patient anatomy and indication for surgery. As Roy et al¹⁰ recommend, prescribing thromboprophylaxis in a patient at low risk of thromboembolism increases their risk of bleeding complications and should not be mandatory for thyroid/parathyroid surgery. Rather, it should be strongly considered in patients with risk factors for thromboembolism (noted above) and in whom difficult, prolonged surgery is anticipated.

REFERENCES

1. Kearon C, Hirsh J. Current concepts: Management of anticoagulation before and after elective surgery. *NEJM* 1997;336:1506-11.
2. Owens CD, Belkin M. Thrombosis and coagulation: Operative management of the anticoagulated patient. *Surg Clin N Am* 2005; 85:1179-89.
3. Douketis JD. Perioperative anticoagulation management in patients who are receiving oral anticoagulant therapy: A practical guide for clinicians. *Thromb Res* 2003;108:3-13.
4. O'Donnell M, Kearon C. Perioperative management of oral anticoagulation. *Clin Geriatr Med* 2006;22:199-213.
5. Dunn A. Perioperative management of oral anticoagulation: When and how to bridge. *J Thromb Thrombolysis* 2006;21: 85-89.
6. Armstrong MJ, Schneck MJ, Biller J. Discontinuation of perioperative antiplatelet and anticoagulant therapy in stroke patients. *Neurol Clin* 2006;24:607-30.
7. Agnelli G. Prevention of venous thromboembolism in surgical patients. *Circulation* 2004;110(supl 4):4-12.
8. National Health and Medical Research Council. Clinical practice guideline for the prevention of venous thromboembolism in patients admitted to Australian Hospitals [homepage on the internet]. Australian Capital Territory, Australia: National Health and Medical Research Council; c2009 [updated 25 July 2011; cited 23 December 2011]. Available from: <http://www.nhmrc.gov.au/guidelines/publications/cp115>.

9. The Australia and New Zealand Working Party on the Management and Prevention of Venous Thromboembolism. Prevention of venous thromboembolism [homepage on the Internet]. Victoria, Australia: Royal Australasian College of Surgeons; c2011 [updated 9 May 2011; cited 23 December 2011]. Available from: <http://www.surgeons.org/racs/fellows/resources-for-surgeons#vt>.
10. Roy M, Rajamanickam V, Chen H, et al. Is DVT prophylaxis necessary for thyroidectomy and parathyroidectomy? *Surg* 2010;148(6):1163-68.
11. National Clinical Guideline Centre—Acute and Chronic Conditions. Venous thromboembolism: Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital [homepage on the internet]. London, United Kingdom: National Institute for Health and Clinical Excellence; c2011 [updated 23 June 2011, cited 23 December 2011]. Available from: <http://www.nice.org.uk/nicemedia/pdf/CG92FullGuideline.pdf>.
12. White RH, Zhou H, Romano PS. Incidence of symptomatic venous thromboembolism after different elective or urgent surgical procedures. *Thromb Haemost* 2003;90(3):446-55.
13. Hull RD, Pineo GF, MacIsaac S. Low-molecular-weight heparin prophylaxis: Preoperative versus postoperative initiation in patients undergoing elective hip surgery. *Thromb Res* 2001;101: V155-62.
14. Strebel N, Prins M, Agnelli G, et al. Preoperative or postoperative start of prophylaxis for venous thromboembolism with low-molecular-weight heparin in elective hip surgery. *Arch Intern Med* 2002;162:1451-56.
15. Hull RD, Brant RF, Pineo GF, Stein PD, Raskob GE, Valentine KA. Preoperative vs postoperative initiation of low-molecular-weight heparin prophylaxis against venous thromboembolism in patients undergoing elective hip replacement. *Arch Intern Med* 1999;159:137-41.
16. Korte W, Cattaneo M, Chassot PG, Eichinger S, von Heymann C, Hoffman N, et al. Perioperative 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 of Anesthesiology, Resuscitation and Intensive Care (ÖGARI) and the Working Group Thrombosis of the European Society for Cardiology (ESC). *Thromb Haemost* 2011 May;105(5):743-49.

ABOUT THE AUTHORS

Kunal Pradip Verma

Resident Medical Officer, Department of Surgery, Royal Melbourne Hospital, Victoria, Australia

Alexandra Gorelik

Statistician, Department of Statistics, Royal Melbourne Hospital Victoria, Australia

Julie Ann Miller (Corresponding Author)

Surgeon, Department of Surgery, University of Melbourne, Royal Melbourne Hospital, Royal Parade Parkville, Victoria, Australia
e-mail: julie.miller@mh.org.au