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Haematoma following thyroid surgery, reducing the incidence in the face of anticoagulant & antiplatelet use

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Abstract

Aims
We aimed to review the haematoma rate in a single surgeons practice and compare it to international standards considering an apparent increasing use of antiplatelet and anticoagulant use and the availability of haemostatic adjuncts.

Methods
A retrospective review of a prospectively maintained thyroid surgery database of a single surgeon, between September 2020 and September 2022 was performed. Data including patient demographics, surgery indication and type and whether haemostatic agents were used was collected.

Results
292 patients underwent thyroidectomy and fulfilled our criteria for inclusion. The haematoma rate was 0.68 % (1/292). 64 patients were deemed to have an increased risk of bleeding and had Floseal® after resection including 23 with Grave's, 9 on anticoagulants/antiplatelets, 3 with a known coagulopathy, and 29 with increased intraoperative bleeding. The non-floseal group consisted of 228 patients.

Discussions
Our haematoma rate compares favourably to international figures despite the suggestion of increased anticoagulant and antiplatelet usage.

Introduction

Postoperative haematoma following thyroid surgery is a rare but potentially lethal complication of thyroid surgery. Definitive surgical management in theatre is usually required to deal with this complication [1]. The incidence of post-thyroidectomy haematoma varies in the literature between 0.48 % to 4.39 %, with certain centres in developed countries reporting

an incidence neck haematoma of less than 2 % [2]. High volume thyroid surgery (> 25 per year) is associated with improved patient outcomes [3].

Risk factors for post thyroidectomy haemorrhage have been widely studied and reported in literature. These include Grave's disease, antithrombotic/antiplatelets; the extent of thyroid surgery, operations for recurrent disease as well as thyroid surgery performed in low volume centres by low volume surgeons [2, 3, 4, 5, 6, 7, 8]

Meticulous haemostasis is essential to prevent postoperative haematoma. Adjuncts to help promote haemostasis include new devices such as LigaSure™ Small Jaw Medtronic, Covidien product, Minneapolis, MN, USA), ultrasound (Harmonic Focus; Ethicon, Johnson and Johnson, Cincinnati, OH, USA), and hybrid devices that join these two technologies (Thunderbeat by Olympus, Japan)[9]. Increasingly biosurgical agents such as Floseal® matrix hemostatic agent (Baxter Healthcare Corporation, Freemont, CA, USA) have been used as further adjuncts to help promote haemostasis, Floseal® haemostatic matrix is a gelatin matrix acting on the coagulation cascade to facilitate fibrin formation promoting coagulation and minimising blood loss, this has also been shown to reduce surgery time in certain circumstances [10]. The aim of this study was to assess the haematoma rate by a single surgeon and compare with internationally reported incidence rates as well as to assess our protocol for reducing the incidence of neck haematoma in the face of an apparent increase in the use of antiplatelets and anticoagulants [11].

Methods

This present study comprised a retrospective review of patients who underwent thyroid surgery by a single surgeon at a tertiary referral centre, over a 2-year period between September 2020 and September 2022. Patients were identified by a reviewing the prospectively maintained database of thyroid surgeries performed by the senior author. Patients excluded included those undergoing parathyroid surgery; patients who underwent a sternal split as well as those who underwent concomitant neck dissection.

Clinical data for this study was obtained by review of the patients' charts, surgical notes and the emergency surgical logbook. Data collected included demographics surgical indication, surgery type, whether Floseal® was used or not and whether a drain was used.

The hospital log of emergency surgeries was used to determine the number of patients with neck haematoma requiring definitive surgical management in the operating room. Their respective medical records were further analysed to determine patient specific risk factors for post operative thyroid haematoma.

The senior surgeon's preference was to perform thyroidectomies early on the operating list to allow observation in recovery. For haemostasis during thyroid surgery, the Thunderbeat™ was used in combination with bipolar diathermy and Ligaclips (Ethicon Endo-Surgery, Cincinnati, OH). After resection the wound is thoroughly washed to remove haematoma. A Valsalva is performed for 20 seconds to 20 mmHg and repeated as required. Typically Surgicel® is placed overlying at berry's ligament. A surgical drain is not routinely used but may be required to reduce dead space and seroma formation. The strap muscles are approximated superiorly with two sutures but not inferiorly to aid in early identification of haematoma. Patients are kept routinely in the recovery for one hour post-surgery with strict post operative instructions to monitor for neck haematoma documented and communicated to ward staff.

It is the senior surgeon's policy to consult cardiology and anaesthetists in patients with any of the above-mentioned criteria. Patients on antiplatelets such as aspirin were advised to stop these medications 5 days prior to surgery. Patients on Novel anticoagulants or warfarin had their medications stopped with anaesthetic and cardiology input preoperatively. Patients were generally restarted on anticoagulants/antiplatelets on day two or three postoperatively.

For statistical analysis patients were further divided into 2 groups. Group 1, who underwent thyroid surgery with Floseal® use and Group 2 who underwent thyroid surgery without Floseal® use. Indications for Floseal® use were patients who were pre-operatively on anticoagulants or antiplatelets which could not be stopped prior to surgery; those with a known coagulopathy, and patients with increased intraoperative bleeding.

Statistical analysis was performed using IBM, SPSS statistics version 29. Data was analysed with an independent sample t-test for independent means and Fisher's exact test for categorical values, with a significance level of $p<0.05$.

Results

During the study period 372 patients were identified. The final study population consisted of 292 patients who fulfilled inclusion criteria. This included 246 (84 %) females and 46 (16 %) males. The mean age of the cohort was 54 years of age. Of these 208 (71 %) surgeries were partial thyroidectomy and 84 (29%) for total thyroidectomy. The incidence of neck haematoma was 0.68 % (2/292).

In 64 patients Floseal® was used and comprised group 1. 228 patients had no Floseal and comprised group 2. 22 out of 64 patients in group 1 had a surgical drain, versus 17/228 in group 2 ($p<0.01$). There was no significant difference in age, gender or surgery type between the two groups (Table 1).

	Floseal (n=64)	No Floseal (n=228)	P value
Mean age (range)	**55 (21-85)**	**53 (20-83)**	***P = 0.54 (t test)***
Gender	**54 f (84%), 10 m (16%)**	**191 f (83%), 37 m (16%)**	***P > 0.1 (χ^2)***
Surgical Drain	**22 (34%)**	**17 (7%)**	***P < 0.1 (χ^2)***

Table 1: Patient demographics and drain usage

There was one haematoma identified in each of group 1 and 2. The group 1 patient was a 41-year-old female who underwent a total thyroidectomy for papillary thyroid carcinoma. The group 2 patient was a 49 year old female with Grave's disease.

37 out of 64 (58 %) of patients in the Floseal® group underwent total thyroidectomy compared to 47 out of 228 (21 %) in the non-Floseal® group $P < 0.1$ (χ^2) (Table 2).

Surgery Type	Floseal (64)	No Floseal (228)	P Value
Partial (208)	**27 (42 %)**	**181 (79 %)**	***P < 0.1 (χ^2)***
Total (84)	**37 (58 %)**	**47 (21 %)**	

Table 2: Breakdown of surgery type

The 83 patients who underwent total thyroidectomy had a higher likelihood of having a surgical drain placed $P < 0.1$ (χ^2) (Table 3).

Surgery Type	Drain (39)	No Drain (253)	P Value
Partial (208)	20 (51 %)	188 (74 %)	$P < 0.1$ (χ^2)
Total (84)	19 (48 %)	65 (26 %)	

Table 3: Surgery Type and Drain

In group 1, 15 % of patients were on anticoagulants or platelets before or during their surgery. 23 (36 %) patients in group 1 had Grave's disease versus 11 (4.8 %) in group 2 (Table 4)

	Floseal (64)	Drain	No Floseal (228)	Drain	P Value
Anticoagulants/Antiplatelets	9 (15 %)	4	0	0	
Coagulopathy	3 (5 %)	3	0	0	
Graves disease / Toxic	23 (36 %)	10	11 (4.8 %)	1	$P < 0.1$ (χ^2)
Increased Intra-op bleeding	15 (21 %)				

Table 4: Indications for haemostatic agent use

Discussion

The thyroid is a highly vascularised organ with a blood flow that exceeds other organs even the brain. It is therefore no surprise that postoperative thyroid haematoma is a known and feared complication of thyroid surgery [10]. Indeed Immediate surgical evacuation on the ward or in the operating room may be required to prevent asphyxia, cardiac arrest or even death [12].

The reported rate of thyroid haematoma varies widely in literature from 0.48 % - 4.39 % with an accepted rate in developed countries in centres performing high volume defined as surgeons performing greater than 25 thyroidectomies per year [3], being less than 2 %. Our rate of 0.68 % compares favourably with this [2, 12].

Antiplatelet and /or anticoagulant medication is common amongst the general population and may represent a significant risk factor for post operative neck haematoma. Oltmann et al. in their review of 4500 patients undergoing thyroid and parathyroid surgery reported patients requiring clopidogrel or any anticoagulant coverage are at much high risk of post operative haematoma [13]. Weiss et al. identified patients with inflammatory thyroid disease and bleeding disorders amongst other risk factors for increased risk of post operative haematoma [4]. Campbell et al. reported antiplatelet/anticoagulant use resulted in twice the odds of postoperative bleeding [8]. As you would expect the prevention of post thyroid haematoma requires careful surgical technique as well as optimization of medical and pharmacological factors that may contribute towards bleeding [7].

There is a lack of consensus as to an adequate timeframe to suspend certain medications prior to surgery however it is commonly advised to stop Novel anticoagulants (NOACs) at least 48 hours prior to surgery, warfarin five days pre operatively as well as stopping antiplatelets including aspirin 3 days before elective surgery and clopidogrel 5 days preoperatively [14].

Obviously post thyroid haematoma prevention is better than treatment, whilst surgeon factors including experience and volume play an important role; anaesthetic factors including a smooth extubation and perioperative blood pressure management are important also. Intraoperative manoeuvres such as the Valsalva are used routinely to help identify bleeding points prior to closure by increasing the venous pressure [3, 15, 16]. Surgical drains have often been used in thyroid surgery however their benefits have not been proven in preventing thyroid haematoma with some studies reporting increased morbidity and longer hospital stays [1, 17]. Surgical drains may play an important role in reducing dead space especially in large thyroids and may help reduce the risk of seroma formation.

Other methods of reducing postoperative bleeding have been investigated such as the use of high energy vessel sealing devices (Thunderbeat™, Harmonic Focus®, LigaSure™) however their benefit is mainly through reduced operating time as opposed to preventing thyroid haematoma [15] It is our practice to use Thunderbeat™. Other surgical adjunct include the use of topical haemostatic agents such as Surgicel®(Johnson and Johnson medical, Arlington Tx), Tisseel® (Baxter Healthcare Corporation, Freemont, Ca, USA) and Floseal®. Local haemostatic agents have been used increasingly in thyroid surgery to achieve haemostasis either actively through activation of the intrinsic coagulation pathway or by including thrombin or fibrinogen to produce a fibrin seal [15]. However their use has not been shown to reduce the incidence of

post operative haematoma but may be an effective adjunct to meticulous surgical technique [10, 15]. To date no device or topical agent has been shown to reduce the incidence of neck haematoma compared with conventional approaches [7].

Our results show that pre operative assessment and good surgical technique results in similar rates of neck haematoma when comparing high risk patients to low risk. Our observed haematoma rate is small so it is difficult to see a statistical difference in the use of Floseal® but results are encouraging.

The limitations of this study include its retrospective nature as well as a relatively small number of patients in the Floseal group.

Preventing the rare complication of postoperative thyroid haematoma is dependent on meticulous surgical technique. Floseal® haemostatic matrix may serve as an effective adjunct in ensuring surgical haemostasis. More research is needed to determine its efficacy in reducing neck haematomas.

Declarations of Conflicts of Interest:

None declared.

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