Vena cava filter audit

The College's Professional Standards Unit wishes to encourage high-quality clinical audit. We therefore periodically publish interesting examples of audits that have been successfully evaluated through our clinical audit certification scheme.

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Introduction

The BCSH guidelines on use of vena cava (VC) filters (Baglin T *et al*, 2006) give clear indications for the insertion of VC filters. The indications are to prevent pulmonary embolus (PE) in the following groups:

- patients with venous thromboembolism (VTE) in whom anticoagulation is contraindicated
- selected patients who develop PE despite therapeutic anticoagulation. Prior to VC filter insertion, long-term high-intensity oral anticoagulant therapy or treatment with low molecular weight heparin (LMWH) should be considered
- pregnant patients who develop extensive VTE shortly before delivery
- patients who must undergo surgery for which anticoagulation has to be interrupted within one month of a VTE
- patients undergoing a pulmonary endarterectomy for chronic thromboembolic pulmonary hypertension.

In 2009, an audit was undertaken at Norfolk and Norwich University Hospital (NNUH), which found that 16/48 patients (33%) undergoing VC filter insertion did not have one of the above indications. This audit also found that local guidelines to discuss cases with a consultant haematologist were not being followed in the vast majority of cases. In addition to this, a substantial number of filters which should have been temporary were not removed (75% or 24/32). A summary is provided at the end of this article.

Following this audit, a revised guideline, intended to give clearer instruction to clinicians, was issued and in January 2011 a service was set up to manage the insertion of VC filters and prevent inappropriate insertions from taking place.

A re-audit of VC filter insertions was carried out in 2012, collecting data retrospectively from January 2011 to September 2012 and prospectively from September to December 2012 to assess what impact, if any, the service and revised guideline had had on reducing inappropriate VC filter insertions, removal of temporary filters and compliance with local guidelines to discuss each case with a consultant haematologist prior to insertion.

Results

From January 2011 to December 2012 (24 months), 70 VC filter insertions were carried out on 69 patients (one reinsertion). Forty patients were female (58%) and 29 male (42%). Patients were aged between 26 and 92 years old; the median age at time of insertion was 73 years old. Thirty-nine patients (57%) had active malignancy at the time of insertion.

The indications for insertion were as follows (detailed in Table 1):

- prevention of PE in patient with VTE where anticoagulation is contraindicated (59%)
- PE despite anticoagulation (9%) – all of these patients had an active malignancy
- VTE in late stages of pregnancy (1%)
- pre-operatively within one month of a VTE (23%)
- pre-pulmonary endarterectomy (9%)
- other indication (7%).

NB. Five VC insertions were for more than one indication.

In total, five (7%) insertions took place for an indication other than those stipulated in the BCSH guidelines (Figure 1).

Of these, two patients had a VC filter inserted following extension of DVT despite therapeutic anticoagulation. Both patients had active malignancy; one had previously had a saddle embolus. A further two patients had a VC filter inserted prior to surgery which took place more than one month after VTE. Both patients had suffered PEs, one had surgery six weeks afterwards and the other patient had the additional risk factor of polycythaemia. Both patients had surgery for active malignancy.

The remaining case not fitting the criteria for insertion specified in the BCSH guidelines bypassed the normal route for insertion of VC filters and was inserted at the time of directed thrombolysis in a patient with extensive thrombosis of both internal iliac veins, inferior vena cava and renal veins. On review of all the cases, this one case (1% of all insertions) was the only one that was not felt to have been indicated.

Seventeen out of 70 cases (24%) had no documentation of a discussion with a haematology consultant, as specified in the local guideline for VC filter insertion. Five of these were cases where a filter had been requested by the cardiothoracic surgeons pre-pulmonary endarterectomy and so bypassed discussion with haematology (Figure 2).

In 19 cases (27%), no mention of the VC filter insertion was made in the hospital discharge letter (Figure 3). One patient had no discharge letter

Table 1: Indications for insertion

1	**Anticoagulation contraindicated**	Number of cases
	GI Bleed	15
	ICH (or large territory ischaemic CVA prior to anticoagulation)	13
	Other bleeding: Haematuria (4) Retroperitoneal (2) Haemoptysis (1) PV bleed (1) Adrenal haemorrhage (1)	9
	DIC (Patient with APML)	1
	Falls (Parkinson's)	1
	Alcoholism	2
2	**PE despite therapeutic anticoagulation**	6
3	**Late stages of pregnancy**	1
4	**Pre-operatively (<1 month)**	16
5	**Pre-pulmonary endarterectomy**	6
Other indications		
	Extension of DVT or new DVT despite therapeutic anticoagulation	2
	VTE >1 month pre-operatively	2
	Pre-thrombolysis	1

Notes for Table 1

One patient had both a GI bleed and ICH, one had both a GI and PV bleed, one had both a GI bleed and required surgery, and one had ICH and required surgery.

GI gastro-intestinal
ICH intracranial haemorrhage
CVA cerebrovascular accident
PV per vagina
DIC disseminated intravascular coagulation
APM acute promyelocytic leukaemia

Figure 1: Reasons for insertion other than those in BCSH guidelines

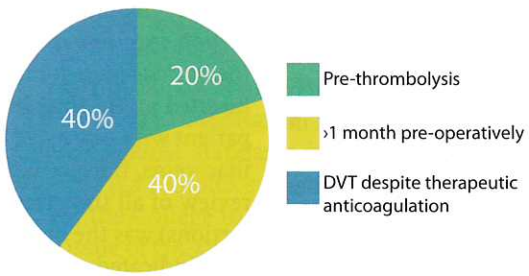
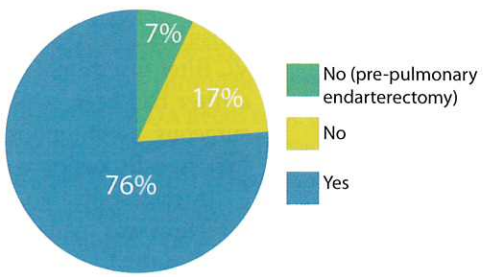


Figure 2: Discussion with consultant haematologist



at all for the episode during which the filter was inserted. Five of the 19 cases were death notifications, which only included the cause of death and no detailed information about the patients' stay in hospital.

Twenty-five filters were inserted for what were considered to be temporary indications (Figure 4). In ten of these (40%), the decision was made to leave the filter in permanently when removal was considered. The cases were examined more closely and discussed with the supervising clinician. The most common reason for keeping the filter in was in patients with a VTE who had a filter inserted prior to surgery for removal of a cancer, in whom the malignant disease was found to be more advanced than anticipated or progressed after surgery. Eight temporary filters (32%) were successfully removed (two filters required a second attempt), one filter was later reinserted for a permanent indication and three attempts at filter removal were unsuccessful (12%). Two patients with temporary filters are due to be reviewed at a future date (8%) and two patients died soon after the filter was inserted (8%).

Forty-five filters were inserted for permanent indications. Sixteen patients have subsequently died with a median time from filter insertion to death of 25 days (range 0–415), reflecting the high number of patients with advanced malignancy in this patient population.

Summary

This re-audit of VC filter insertion and removal following the introduction of the VC filter service found that there has been a reduction from 33% to 7% in the insertion of filters for reasons not stipulated in the BCSH guidelines, although only 1% were considered inappropriate on review of the individual cases.

This reduction is thought to be because of:

- the more robust system of filter insertion subsequent to setting up the VC filter service, which involves a system of vetting by the interventional radiologist
- the guideline, which suggests a pre-insertion discussion with a consultant haematologist who helps clinicians to explore the alternatives.

The tracking of patients carried out by the VC filter service means decisions about removal of temporary filters are made early and in discussion with the supervising clinicians and consultant haematologists. This seems to have been instrumental in improving the proportion of filters for temporary indications that were successfully removed; the figure rising from 25% to 32% (73% of filters if cases where the decision was made to keep the filter in, those who died before removal could be considered and those in whom the decision about removal is due to be reviewed in the

Figure 3: Documentation in discharge letter

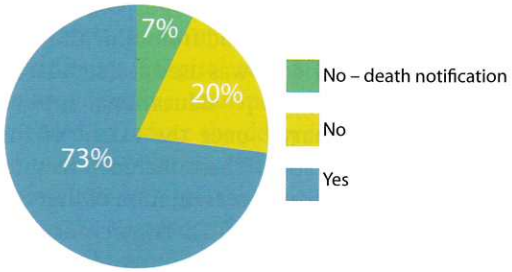
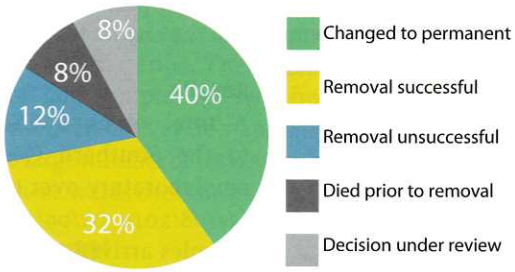


Figure 4: Fate of temporary filters



coming weeks – the outcome of which is not known yet – are discounted).

In the majority (76%) of cases, a discussion with a consultant haematologist on the subject of filter removal was documented. Some of the remainder may have been discussed and not documented, but it is impossible to be sure how many were not recorded due to poor record-keeping. An indication of poor record-keeping can be seen in the 27% of discharge summaries that failed to mention the insertion of a VC filter (20% if death notifications are excluded).

There is some room for improvement: the usual suspects of poor record-keeping and communication are seemingly impossible to eradicate altogether, but the introduction of a VC filter service to ensure clinicians have explored alternatives to VC filters and tracking patients to ensure removals are considered and carried out as early as possible for those patients in whom it is indicated has improved both appropriateness of insertion and the successful removal of temporary filters.

Since over a quarter (27%) of filters were technically impossible to remove when removal was attempted, and a further 18% required more than one attempt at removal before the filter could be successfully retrieved, it is very important to consider the alternatives to insertion.

Conclusion

The filter service and guideline have been instrumental in reducing the number of inappropriate filter insertions and increasing the proportion of temporary filters that are appropriately removed.

Following this audit, a standard operating procedure (SOP) for filter removal was devised to make the process of removal as smooth as the process of insertion has become.

A re-audit of VC filter insertion is suggested for the 12 months following the introduction of this SOP and re-enforcing of the guidelines, which will take place in early 2013.

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Delay in CSF sample delivery: is this a problem?

Background

Accurate cerebrospinal fluid (CSF) cell counts are essential in the management of suspected meningitis, and rapid transportation to the laboratory avoids lysis of cells.[1] CSF are high-value, non-repeatable specimens that involve a degree of patient discomfort with potential complications. Appropriate antibiotic therapy may be delayed with a detrimental effect on patient outcome and poses a significant clinical governance risk.

Objectives

The objectives of this audit were to elucidate:

1. The proportion of CSF samples received >6 hours since time taken to the laboratory.
2. The identification of the department and hospital from which the 'late' samples were received.
3. The month in which most 'late' samples were received and whether this corresponds to new doctors commencing work.
4. The gender of the patients identified as 'late' samples.
5. The time at which 'late' samples were taken and received by the laboratory.
6. The need to be aware of last collection times for specimens from the ward.
7. The effect of educational interventions on the arrival of CSF samples.