Vault haematoma and febrile morbidity after vaginal hysterectomy

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Vaginal hysterectomy is associated with significant risk of vaginal vault haematoma (40%) and febrile morbidity (30%). Numerous interventions have been used to try and avoid these complications but very few have been shown to be effective.

For some years it has been recognized that vaginal hysterectomy has certain advantages over abdominal hysterectomy (Dicker et al, 1982a). The vaginal route is associated with lower mortality, less risk of operative haemorrhage, less thromboembolic disease and fewer blood transfusions (Andersen et al, 1993). Vaginal hysterectomy also facilitates shorter hospital stay, quicker postoperative recovery and gives better cosmetic results — all of which are leading to a gradual increase in the number of hysterectomies performed vaginally rather than abdominally. In the UK, data from the RCOG Medical Audit Unit, in the vaginal, abdominal and laparoscopic uterine excision (VALUE) hysterectomy survey (Maresh, 1997), revealed that 21% of all hysterectomies performed for dysfunctional uterine bleeding were performed vaginally.

The commonest complication of vaginal hysterectomy is the formation of a vault haematoma (*Figure 1*), also known as pelvic fluid collection, vault abscess or pelvic abscess. The classical presentation is a generally slow and uncomfortable postoperative recovery, getting worse a few days after operation, following an initial good episode, frequently with a low or high grade pyrexia and often with associated urinary disturbance. The haematoma may discharge spontaneously between 3 and 14 days postoperatively, which often leads to increased hospital stay or the need for re-presentation and re-admission to hospital (Thomson et al, 1998).

HOW COMMON IS VAULT HAEMATOMA AFTER HYSTERECTOMY?

The clinical detection of diagnosed haematomas occurs in 3.9–10.0% of patients after a vaginal hysterectomy (Harris, 1995). However, the true incidence of vault haematoma is likely to be much higher, as not all haematomas will present in this way or may not be detected until after discharge from hospital. Improved diagnostic techniques have used ultrasound.

A Medline and PubMed search shows that six studies have examined the use of ultrasound to detect vault haematomas and these are summarized in *Table 1* (Kuhn and De Crespigny, 1985; Toglia and Pearlman, 1994; Haines et al, 1995; Slavotinek et al, 1995; Eason et al, 1997; Thomson et al, 1998). The prevalence of vault haematoma detectable on scan after hysterectomy ranges from 98% down to 25%. The overall prevalence of haematoma among the 467 patients included in these studies is 40%.

Unfortunately the studies vary in design, as shown in *Table 1*, with inclusion of vaginal and/or abdominal hysterectomies, use of abdominal or transvaginal ultrasound and vary-

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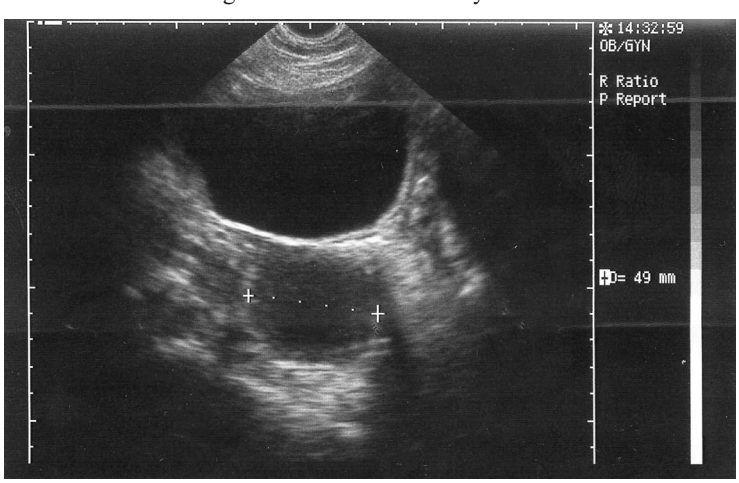

Figure 1. Transabdominal ultrasound 3 days after vaginal hysterectomy showing characteristic appearance of vaginal vault haematoma.

TABLE 1.
The prevalence of vault haematoma following hysterectomy with study details

Study	No. of patients	Patient selection	Vaginal hysterectomies	Abdominal hysterectomies	Abdo/vaginal ultrasound	Prevalence of haematoma
Kuhn and De Crespigny (1985)	50	Consecutive	50	0	Abdominal	98%
Toglia and Pearlman (1994)	38	Random	6	32	Vaginal	34%
Haines et al (1995)	66	Random	Unspecified, both included		Vaginal	42%
Slavotinek et al (1995)	32	Consecutive	8	24	Vaginal	59%
Eason et al (1997)	58	Random	0	58	Vaginal	62%
Thomson et al (1998)	223	Consecutive	223	0	Vaginal	25%
Total	467		287+	114+		40%

ing outcome measures. Perhaps most importantly the studies differ in their diagnostic criteria for haematoma. The studies giving the lowest prevalence of haematoma formation only diagnosed a haematoma if it measured at least 2 cm by 2 cm in its largest diameters (this measurement was chosen by the ultrasound department as the limit of certainty that the scan finding was a haematoma and not artifact). Other studies diagnosed haematomas much smaller than this, often on abdominal ultrasound which is not as accurate as vaginal ultrasound (Kossoff et al, 1991).

WHY DO VAULT HAEMATOMAS OCCUR?

As with most postoperative complications, clinicians partly attribute vault haematomas to specific patient circumstances (e.g. operative difficulty, general health, ease of haemostasis) and partly to technical difficulty. Others are more likely to lay the blame with poor operative technique or competence. It has been suggested that the use of operative drains, the administration of antibiotics or leaving the vaginal vault open will reduce or prevent haematoma formation. In reality it is not possible to accurately predict those patients likely to develop a haematoma.

Haematomas presumably form as a result of residual bleeding at the end of the operation. To examine the incidence and site of such bleeding Wood et al (1997) performed a diagnostic laparoscopy at the end of 50 vaginal hysterectomies. They found that 48% of patients still had evident intra-abdominal bleeding points at the end of the vaginal surgery, predominantly from the vaginal vault but from the uterine artery or vaginal angle in 20% of cases. These figures correspond roughly with the overall 40% haematoma rate following hysterectomy. Proponents of laparoscopic-assisted vaginal hysterectomy (LAVH) suggest that one of the main advantages of this surgical approach is the identification of bleeding points to achieve adequate haemostasis. Unfortunately the published data do not entirely support this, as vault haematoma was still detectable on scan in 31% of patients following LAVH (Yuen and Rogers, 1996).

WHAT IS THE SIGNIFICANCE OF VAULT HAEMATOMA?

The significance of clinically detectable haematomas, with the discomfort, pyrexia, urinary complications and prolonged recovery that they present with, is undisputed. A more contentious issue is the significance, or insignificance, of detecting a haematoma at postoperative ultrasound. The published studies disagree. The main morbidity factor examined is that of febrile morbidity, usually defined as a pyrexia of greater than 38°C for more than 24 hours, excluding the first 24 hours postoperatively. This is of particular relevance in hysterectomy as unexplained febrile morbidity is a common finding (5–10%) for which the aetiology and management remain uncertain (Dicker et al, 1982b; Harris, 1995; Shackelford et al, 1999).

Of the six studies using postoperative ultrasound to detect haematoma formation, four found no significant relationship between the presence of a haematoma and subsequent morbidity. These studies (Kuhn and De Crespigny, 1985; Haines et al, 1995; Slavotinek et al, 1995; Eason et al, 1997) included small numbers (32 to 66) and included mainly abdominal hysterectomies (128 of 206 total patients). Although individually the studies showed no significant relationship between haematoma formation and febrile morbidity, this may be because of the small study numbers and relatively high haematoma detection rate (68%). Once combined they show an overall febrile morbidity rate of 31% — comprising 39%

febrile morbidity in the patients with haematoma compared with only 16% in the non-haematoma group.

The other two studies (Toglia and Pearlman, 1994; Thomson et al, 1998) both show a significant relationship between haematoma and febrile morbidity. Notably these studies included a larger number of patients (261 total) and the vast majority of hysterectomies were performed vaginally (231/261). The haematoma detection rate in these studies was much lower (26%), probably because they used only transvaginal ultrasound and only diagnosed a haematoma if it measured at least 2 cm by 2 cm in its largest diameters. Of patients with a vault haematoma, 37% experienced febrile morbidity compared with only 8% of those who had no haematoma.

The current balance of evidence is that the presence of a vault haematoma at postoperative ultrasound suggests that the patient is significantly more likely to experience febrile morbidity and other morbid factors (*Table 2*) (Thomson et al, 1998).

TABLE 2.
Conditions more likely to be seen in patients with postoperative vault haematoma detected at ultrasound

Febrile morbidity
Blood transfusion
Greater drop in haemoglobin levels
Longer hospital stay
Representation and readmission to hospital

HOW TO DETECT A VAULT HAEMATOMA

The detection of vault haematoma may be by clinical examination or imaging. Up to 10% will be detected on clinical examination alone. The possible imaging techniques are ultrasound, computerized tomography (CT) or magnetic resonance imaging (MRI). The gold standard for detection of vault haematoma is transvaginal ultrasound, and this is the modality used in all the published literature (*Figure 2*). Although there are papers describing CT-guided pelvic abscess drainage, this has not been described in gynaecological practice.

CAN VAULT HAEMATOMA BE PREVENTED?

Many authors have examined methods of reducing post-hysterectomy morbidity. Unfortunately very few of them focus on haematoma formation specifically, and even fewer use ultrasound to detect haematomas.

Antibiotic prophylaxis has long been known to reduce febrile morbidity and severe infection following hysterectomy (Glover and van Nagell, 1976; Wheeless et al, 1978). It has also been established that the length of course does not seem important (Benson et al, 1985) and that a single dose is satisfactory (Lander and Steigrad, 1978). Unfortunately none of the studies examining the effect of antibiotics used ultrasound to check for haematoma formation. The only study of antibiotic effect on prevention of clinical haematoma rate (Poulsen at al, 1984) did show a reduction in haematoma rate (14% to 2%), but this was not significant as there were only 50 patients in each arm of the study. If a preventative procedure were to be tested, power calculations demonstrate that to show a 50% reduction in clinical haematoma formation, with 80% power, a total of 1810 patients would need to be recruited to the trial (compared with 182 patients if ultrasound detection is used).

Some surgeons advocate the use of operative drainage to prevent haematoma formation, accepting that absolute haemostasis is not always possible. Drainage may be by leaving the vaginal vault open or the use of surgical drains. Of studies of operative drains, none used ultrasound to detect haematomas and no significant reduction in clinical haematoma rate was demonstrated (Swartz, 1979; Wijma et al, 1987; Poulsen at al, 1984; Scotto and Sbiroli, 1985). Once again these studies include only small numbers.

When examining the use of open *vs* closed vaginal vault technique in the prevention of haematoma, all three published papers were of

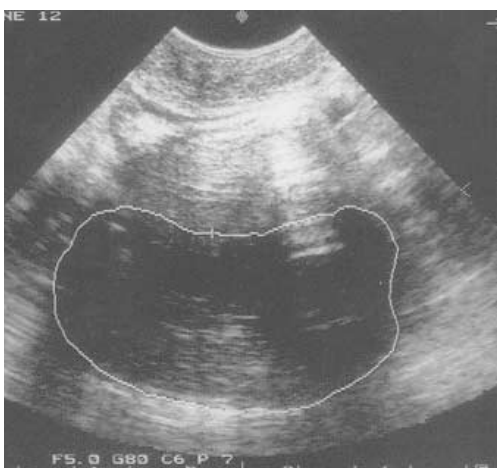

Figure 2. Transvaginal ultrasound 3 days after vaginal hysterectomy showing vault haematoma (outlined).

abdominal hysterectomies. Two of these did not use ultrasound to detect haematoma and subsequently included too few numbers to show significant change in clinical haematoma rate (Neuman et al, 1993; Colombo et al, 1995). The third, by Aharoni et al (1998), used vaginal ultrasound to detect haematomas and did show a significant reduction in haematoma formation for the open vault group ($P<0.01$). The authors concluded, however, that the increased operation time for the open vault technique was not warranted, as the reduction in haematoma formation was not associated with decreased postoperative hospital stay.

In brief, there are very few data to suggest how best to avoid haematoma formation. We are aware of a forthcoming trial of open *vs* closed vaginal vault in vaginal hysterectomy, which will examine the incidence of postoperative vault haematoma by ultrasound and will correlate this with other postoperative morbidity factors.

HOW SHOULD VAULT HAEMATOMA BE TREATED?

Unfortunately there is a complete lack of literature comparing management for vaginal vault haematomas of either the clinically apparent or asymptomatic ultrasound detected varieties. When a patient presents with a clinical haematoma the options are to do nothing, give antibiotics or promote drainage (digitally, under anaesthetic or ultrasound guided). Owing to the dearth of evidence there is no suggested best practice and clinicians should continue assessing patients' management on an individual basis.

As for the apparently asymptomatic haematomas detected on ultrasound, no trials of management have been undertaken. Only when such studies have been completed will we be able to suggest the best management for these patients. HM

Conflict of interest: none.

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KEY POINTS

- Post-hysterectomy vault haematomas are common (40%).
- Transvaginal ultrasound is most effective for detection.
- Haematomas lead to increased morbidity.
- Prevention is difficult: antibiotics may help, drains do not help and open vault technique may reduce haematoma formation but not length of hospital stay.
- Treatment is uncertain and unproven.