# Introduction of a manual vacuum aspiration service: a model of service within a NHS Sexual Health Service

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# ABSTRACT

**Background** We assessed the applicability, acceptability and cost implications of introducing the manual vacuum aspiration (MVA) technique with local anaesthesia for fully conscious first-trimester termination of pregnancy within our service and for our population.

**Setting** The outpatient setting of a Pregnancy Advisory Service within a NHS Sexual Health Service.

**Methods** Self-administered misoprostol and diclofenac, extra-amniotic local anaesthetic gel and paracervical mepivicaine prior to MVA. Routinely collected data were used to provide information on uptake, demographic details, timing, pain score, complications, contraceptive uptake, and economic implications for our service.

Results MVA was chosen by 305/1681 potentially eligible women. Forty percent had the procedure on the day they attended for assessment. Seventynine percent gave a pain score of 3 or less out of 10. Complications occurred in six cases (2%); these included cervical rigidity, a false passage, retained products of conception, bleeding (more than 200 ml) and one allergic reaction. Eighty percent of women chose to commence a long-acting reversible contraception (LARC) method at the time of MVA. Operating theatre utilisation was reduced by one termination list per week and cost savings of around £60 000 per annum were realised. **Conclusions** The technique for fully conscious MVA was very suitable for our outpatient setting. It was associated with very low levels of pain and bleeding. The uptake of LARC was high, and particularly the ability to provide intrauterine contraception at MVA was associated with a very high uptake.

# INTRODUCTION

Abortion care remains almost the only acute health need not comprehensively provided for within the National Health Service (NHS). Statistics for 2012 show

# Key message points

- Manual vacuum aspiration (MVA) with extra-amniotic and paracervical local anaesthesia resulted in a low pain score in 79% of women choosing fully conscious first-trimester surgical abortion.
- Forty percent of procedures were completed on the day of first attendance for assessment, with an average attendance time of 2.5 hours.
- The complication rate was 2% and the uptake of long-acting reversible contraception was 80%, with 51% choosing an intrauterine system fitting at the time of the MVA.

that although 97% of abortions for residents in England and Wales were funded by the NHS, 62% took place in the independent sector under NHS contract.<sup>1</sup>

The Pregnancy Advisory Service (PAS) in Gloucestershire is part of the Sexual Health Service, serving a population of around 500 000. The service is located in a stand-alone building on the same hospital site as maternity and gynaecology services. It provides care to approximately 1500 women per annum who are considering abortion, and over 90% of women with a Gloucestershire postcode undergoing abortion complete the process within this service. There are multiple access pathways including general practitioner referrals, referrals from a range of other health care providers and self-referrals. Until May 2011, only surgical operating theatre-based or medical outpatient-based procedures were provided. Occasionally a local anaesthetic procedure was provided to women





undergoing surgical abortion in theatre, either for medical reasons or on patient request. It was felt that manual vacuum aspiration (MVA), a technique originally developed as a low-technology method of uterine evacuation for developing countries, might be a better method for suitable women and that the outpatient facility would be a preferable setting, with potential cost savings as well as greater choice and safety. We viewed this as a potential QIPP (NHS Quality, Innovation, Productivity, Prevention) initiative.

# **METHODS**

Prior to May 2011, women wishing to proceed with termination were offered a choice of early medical abortion (EMA) up to 9 weeks 2 days or surgical termination in theatre up to 16 weeks 6 days. Where the pregnancy had exceeded this gestation, women were assessed and referred to an independent provider, accounting for 4% treated elsewhere under an NHS contract. From May 2011, in addition to the above options, women up to 12 weeks 6 days were also offered the option of MVA under local anaesthesia within the Sexual Health Service outpatient setting. A business case was written and a procedural policy for MVA was ratified by the Trust Policy and Clinical Governance groups. Our experience and the outcomes during the first 18 months are presented.

### Assessment

Woman attending PAS had an ultrasound scan and were offered counselling within the clinic. They were asked to do a self-taken swab for chlamydia and had blood taken for haemoglobin, blood group and antibody screen and, with consent, full antenatal virology screening. Verbal and written information was provided covering the full range of procedural options and available dates. Women were considered unsuitable for outpatient MVA if they were not inclined to have a procedure while fully conscious, if they gave a history of difficulty tolerating speculum examination, or if they had complex medical problems (such as cyanotic congenital heart disease) or were at high risk for bleeding (known clotting factor deficiency or significant platelet disorder). High-risk medical and surgical cases, particularly those at significant risk of bleeding, were managed in theatre with anaesthetic support and trained recovery staff, even if their procedure was performed under local anaesthesia. The MVA procedure was offered to women who had never experienced a speculum examination provided they expressed a clear preference for MVA following detailed discussion of all the procedures for which they were suitable. Women attending with evidence of retained products after medical or surgical termination, or where an intrauterine pregnancy was found to be non-viable at assessment, were offered the same medical and surgical options, including MVA, or conservative management.

# The procedures

#### Manual vacuum aspiration

MVA procedures were carried out in the outpatient setting of the Sexual Health Service. The first 200 procedures were performed by one of three doctors who had extensive experience of surgical abortion. The first author was experienced at providing a range of intrauterine procedures with local anaesthesia, including abortion, and trained the others in the technique. One nurse and one health care assistant (HCA) were present for each procedure. During the last 6 months of data collection procedures were also performed by four specialist registrars in Community Sexual and Reproductive Health (CSRH) who attended the service to receive MVA training.

On arrival, women self-administered  $2 \times 200 \,\mu g$  misoprostol tablets sublingually or vaginally, and they were offered diclofenac 100 mg rectally, which most chose to self-administer. Some 60-90 minutes later, 11 ml Instillagel® (2% lidocaine gel with chlorhexidine) was inserted through the cervix into the extra amniotic space using an Instillaguil, as described elsewhere.<sup>2</sup> In a minority of cases the cervix was found to be tight, so a further 200 µg misoprostol was administered and more time allowed for cervical preparation. The MVA procedure was otherwise performed approximately 20-30 minutes after the Instillagel administration. Additional analgesia was given by means of a paracervical block with 3×2.2 ml ampoules of 3% mepivicaine injected at the 12, 3 and 9 o'clock positions using a dental syringe with a long 27 g needle, in the manner described by Hamoda et al.<sup>3</sup> Entonox<sup>®</sup> was available on request.

The same gynaecology couch used for scanning during assessment was used for the MVA procedures, so the scanner was available at the bedside if needed. The procedures were performed using suction curettes of 6-10 mm diameter, aiming to use a curette size equivalent to the number of weeks of gestation. Where significant resistance was encountered when dilating, a smaller suction catheter was used. We did not attempt to use a suction curette greater than 10 mm diameter in any MVA case. For cases beyond 10 weeks gestation a 10 mm catheter was used and we found this efficient up to 12 weeks 6 days. The vacuum was created with a 60 ml hand-held svringe with a self-locking mechanism (Rocket Medical). Where necessary the cervix was dilated using Hegar dilators, and in a small minority where cervical rigidity was encountered, tapered dilators were used. In difficult cases, and during some training procedures, transabdominal ultrasound was used during the procedure to assist guidance. At the end of the procedure if there was any doubt about completeness the uterus was checked with transabdominal or transvaginal ultrasound.

Contraception was discussed at the initial assessment, and the full range of long-acting reversible

contraception (LARC) methods was offered at the time of the MVA procedure. Before discharge women were asked by the HCA or nurse to indicate the worst level of pain that they had experienced during the entire procedure, either on a visual analogue scale or on a verbal scale. The range suggested was from 1 (no pain/mild discomfort) to 10 (the worst pain imaginable), with a score of 3 comparable with the level of pain they might experience with a period.

#### Early medical abortion

A standard two-stage procedure with mifepristone 200 mg followed by misoprostol 24–72 hours later was provided. Women had the choice of going home after misoprostol or staying in a medical suite. Those choosing to go home were given a supply of co-codamol unless contraindicated. A wider range of analgesia including intramuscular pethidine, oral morphine and Entonox was available to those choosing to stay in the medical suite.

### RESULTS

Data are summarised for the first 18 months of the service. Where possible and appropriate we have included data for the other methods offered to women during the time frame.

All new appointments at the service are summarised in Table 1. The age range was from 15 to 45 years.

At the outset for very young nulliparous women and women who had not undergone vaginal delivery we included the option of MVA up to 10 weeks (70 days) and for parous women up to 12+ weeks (87 days). However, on the basis of our experience with the first 20 cases the procedure was subsequently offered to all women up to 12 weeks 6 days. Eight women choosing EMA completed their procedure with MVA due to inadequate pain control with opiates. Their data are included with the EMA cases since they started with that as their chosen procedure and had already been in the suite for several hours and experienced severe pain before their decision to request completion with MVA.

#### Time of procedure

Where possible women were offered the MVA procedure on the day that they first attended the PAS and 40% completed the procedure on that day. Where a same-day procedure was offered, some women opted for a later date for their convenience.

The total time from arrival for the procedure to discharge ranged from 1.5 to 5.75 hours. The mean and median times from arrival to discharge were 2.5 and 2.57 hours, respectively. Eighty percent of cases had a total attendance time of less than 3 hours, and 4% attended for more than 4 hours. No women required hospital admission following MVA. Table 1New appointments and attendance at the PregnancyAdvisory Service for the 18-month period from 1 May 2011 to31 October 2012

Summary of PAS referrals	Patients [ <i>n (</i> %)])	
New clinic appointments	2401	
Number of patients attending	2152	
Attended — found not pregnant	29	
Attended – too early to confirm location	87	
Attended – non-viable pregnancy/miscarriage confirmed	76*	
Referred to gynaecology		
Suspected ectopic pregnancy (eight cases confirmed; remainder ectopics of unknown location or unconfirmed)	14	
Molar pregnancy	1	
Attended – undecided further appointments/ eventual TOP	108	
Attended – decide to continue pregnancy	143	
Attended		
$\geq$ 17 weeks: referred to independent provider	49†	
$\geq$ 24 weeks: referred for antenatal care	2	
Procedures performed		
EMA	680 (36%)	
MVA	305 (16%)	
Theatre: Suction TOP/D&E	899 (48%) (180≥13 weeks)†	
Theatre: ERPC	26	
Did not attend		
For PAS clinic	249	
For EMA/MVA	25‡	
For theatre list	53±	

\*Patient choice of conservative, medical or surgical management. +MVA not offered to 229/1959 (11.5%) women wanting a procedure owing to gestation  $\geq$ 13 weeks.

<sup>‡</sup>Some did attend but were undecided and so did not proceed with the booked procedure.

D&E, dilatation and evacuation; EMA, early medical abortion; ERPC, evacuation of retained products of conception; MVA, local anaesthetic manual vacuum aspiration; PAS, Pregnancy Advisory Service; TOP, termination of pregnancy.

#### **Blood loss**

Obvious products of conception were aspirated in every case and this was accompanied by almost no blood loss except in one MVA performed for evacuation of retained products, where colour Doppler scanning showed evidence of high flow, and one case that followed a possible allergic reaction to the medication given for cervical priming. These were the only two cases where cannulation and intramuscular Syntometrine<sup>®</sup> were required.

# Pain scores

The pain scores are represented in Figure 1. In 22 cases no score was recorded through oversight, but there was nothing in the records or staff recollection to indicate these were not comparable with other cases. The worst level of pain experienced was scored at 3 or less out of 10 by 224/283 women (79%). A



Figure 1 Manual vacuum aspiration pain score out of 10.

majority of women stated they did not consider the procedure painful or that it was much less painful than they had expected. Ten women gave a score of 0 despite a suggested scale of 1 to 10, saying they did not consider they experienced any pain at all during the procedure. Only three women took up the option of using Entonox during the procedure. No women choosing MVA required controlled drugs for analgesia. We did not have any case with symptoms of local anaesthetic toxicity.

We did not ask women choosing EMA to assign a pain score, as this was not practical with less than half of them completing the procedure within the Sexual Health Service setting. However, data available from the patient experience questionnaires received during the time frame indicated that MVA and EMA patients were similarly satisfied with all areas of the service except that some EMA patients experienced more pain than they had expected.

All eight of the women completing EMA by MVA had already received two doses of opiates before deciding to complete their terminations with MVA. Of 680 women choosing EMA over the time period, just under half aborted in the unit and 84 of these required opiate analgesia. The number of women completing at home who might have wished for stronger analgesia is unknown.

# High pain scores

Seven of 305 women undergoing MVA gave a pain score of 7. Their ages ranged from 18 to 41 years, and they included both nulliparous and parous women. One case was the evacuation complicated by haemorrhage and another was complicated by cervical rigidity. These are summarised in Table 2. The other five cases giving a score of 7 had no identifiable factors as to why their procedure was painful. One woman gave a score of 9. She is also summarised in Table 2. All three women who took up the option of Entonox gave a high pain score.

# Complications

Six patients with complications are summarised in Table 2.

# **Continuing contraception**

Women choosing EMA were offered the same range of contraception as offered to surgical cases, except that those wanting an intrauterine device were advised they would need an appointment in 4 weeks for the fitting. The contraceptive method chosen or provided at the time of MVA and EMA is detailed in Table 3.

While 80% of women undergoing MVA chose a LARC method for continuing contraception, only 48% of women undergoing EMA did so.

# **Patient experience**

One anonymous annual patient experience survey coincided with the 18 months of data collection. The survey comprised 50 consecutive patients utilising each

 Table 2
 Complications with manual vacuum aspiration

Patient	Complication	Outcome
1	MVA for uterine evacuation 4 weeks post-EMA. Presented with moderate bleeding despite further misoprostol and antibiotics. Scan showed retained products measuring $4\times2.5\times3$ cm with very high flow. Brisk loss of 200 ml as soon as instrumented. Controlled with bimanual compression and Syntometrine <sup>®</sup>	Moderate loss continued for 2 hours. Remained in the unit 5.75 hours, longer than any other case. Histology showed necrotic decidua and scanty villi
2	Para 3, 7 weeks. Initial failed dilatation due to rigid cervix and pain. Further misoprostol and completion of MVA with ultrasound guidance 1–2 hours later. Ultrasound demonstrated that the initial failure had been associated with a false passage at the point of retroflexion. Procedure completed with ultrasound guidance and IUS fitted	High pain score (9) at initial attempt. At follow up the IUS was missing and perforation confirmed. In retrospect it was unwise to have inserted the IUS when false passage had occurred even though it was possible to complete with ultrasound guidance
3	Para 0, 9 weeks 4 days. Cervical rigidity. Not possible to dilate beyond 6–7 mm. Performed through a 7 mm suction catheter which blocked repeatedly	High pain score (7). Incomplete – 3×2 cm area of retained products managed conservatively
4	Para 0, 7 weeks 5 days. Rigid cervix and prolonged bleeding	Uterus empty at follow-up scan
5	Prolonged bleeding. Small amount of retained products did not resolve despite misoprostol and antibiotics	Repeat MVA with antibiotic cover. Bleeding settled
6	Possible allergic reaction. Stridor and a rash followed administration of misoprostol and diclofenac. Settled with hydrocortisone and antihistamine	Moderate fresh blood loss at MVA (<150 ml) settled with Syntometrine

EMA, early medical abortion; IUS, intrauterine system; MVA, manual vacuum aspiration.

# DISCUSSION

MVA has been in widespread use in developing countries for over two decades, and more recently in the USA, and by some private providers in the UK. It has been shown to be effective for management of both first-trimester abortion<sup>3</sup> and miscarriage.<sup>4</sup> Despite this, NHS services in the UK have tended to offer standard suction termination under general anaesthesia to women who decline or are too late for a medical procedure. This is reflected in the difficulty that CSRH trainees in many areas are currently experiencing in obtaining MVA training to achieve the required competencies of the core curriculum. We hope that reporting our experience may encourage other providers to introduce this option.

Some providers may presume that MVA will be less acceptable to women, or be associated with a level of pain that women will not accept. There may also be a lack of confidence among clinicians at the idea of providing a surgical procedure of a sensitive nature to fully conscious women. Our own data accord with published data, which support the notion that MVA may be less painful than EMA and that women are more likely to be satisfied with surgical than medical abortion.<sup>56</sup>

At the outset our objective was to increase choice within our service. We did not set out to compare and contrast MVA with EMA, but certain advantages became evident. First, we found MVA to be equally effective from 5 weeks to 12 weeks 6 days. Although medical methods can be used at later gestations, evidence shows that their acceptability declines with increasing gestational age beyond 9 weeks.<sup>5</sup> Second, MVA is quicker than EMA, taking around 10 minutes, but requiring attendance of around 2.5 hours to allow cervical preparation. Third, it is complete at the time, allowing insertion of intrauterine contraception as part of the procedure. Published data show that women frequently fail to attend for a deferred fitting appointment following abortion.<sup>7</sup> Finally, around 50% of women choosing EMA do not complete their abortion within our service and this incurs considerable follow-up work, which is not needed with MVA.

The main cost savings to our service were realised by replacing surgical procedures in theatre with MVA procedures. For women there is the added safety of avoiding general anaesthesia, the convenience that they do not need to starve before the procedure and be 'recovered' after it, and that they do not need another adult to take them home.

We feel that patient selection is very important, as women who have significant difficulty tolerating a pelvic examination are unlikely to find the procedure acceptable. We find it much more difficult to predict the minority of women who will not cope well with EMA and this was reflected in the patient experience survey.

We were pleasantly surprised that 79% of women felt the procedure was either not painful at all or comparable to the level of pain they would experience

#### Table 3 Choice of contraception % EMA % MVA Method 23 4 1.3 Condoms 3.5 Oral (COC or POP) 320 47.0 50 16.4 DMPA 122 18.0 24 7.9 Implant 41 13.5 150 22.0 IUD/IUS 55\* 8.0 179 58.6 Declined 7 10 1.5 2.3 Total 680 100.0 305 100.0

\*We are unable to clarify how many women expressing an intention to use intrauterine contraception following EMA actually underwent a fitting. COC, combined oral contraceptive; DMPA, depot medroxyprogesterone acetate; EMA, early medical abortion; IUD, intrauterine device; IUS, intrauterine system; MVA, manual vacuum aspiration; POP, progestogen-only pill.

of four options provided by the service, namely EMA and MVA within the Sexual Health Service clinical area and each of two theatres, one on the same hospital site and the other on a hospital site 8 miles away. The questionnaire return rate was 56% and 60% for EMA and MVA, respectively, but only 15% for women attending a theatre site. Overall all the returned questionnaires indicated a high level of satisfaction with the waiting time for appointments and procedures, and with the care provided by staff. The main differences highlighted were that 100% of responses from the surgical cases (MVA and theatres) indicated that the women were very happy with the support given and that the process was as expected following the information and advice given. However, only 75% of EMA responses indicated the same high level of preparation, with 25% responding that the process was to some extent not as they had expected following information and advice. This reflected the difficulty in predicting the level of pain and in preparing women for the pain experience and analgesia needs of EMA.

# Costings

Within 4 months of introducing MVA it was possible to replace one of three weekly theatre lists with MVAs. The saving on the theatre recharge was £92 000 per annum. The costs for setting up and running the MVA sessions amounted to £28 000 per annum. However, the procedure room containing the scanner, the electric gynaecology couch and a mobile light were already in use by the service and were more fully utilised once the MVA sessions commenced. The main consumable cost was contraception. Owing to the high uptake of LARC, particularly the 51% uptake of the intrauterine system, this averaged £235 per session of four cases. There were additional setup costs for purchase of dilator sets and theatre clothing. Overall for our service the difference in cost of the weekly theatre list against running two MVA sessions per week resulted in an annual saving of around £60 000.

with a period. There are two elements to the technique that we employed for pain relief. One is extraamniotic instillation of lidocaine gel. Instillation of 5 ml 4% lidocaine through the cervix 3 minutes before first-trimester abortion has been shown to provide significant reduction in pain during cervical dilation and suction aspiration,<sup>8</sup> while instillation of 1% lidocaine failed to provide pain relief.<sup>9</sup> However, there was a high rate of toxicity with instillation of the higher concentration. We instilled 11 ml 2% lidocaine gel, but allowed considerably longer for absorption (20-30 minutes). This technique also provided an opportunity to assess cervical priming and to extend this where the cervix did not admit the quill or gel with ease. Extending the duration of priming in potentially more difficult cases may also have influenced pain scores. The second element, paracervical injection of mepivicaine, has been studied for a range of gynaecological interventions. A recently updated Cochrane review found that deep local anaesthetic injection was associated with significantly less pain during cervical dilatation and uterine intervention than placebo injection (saline or water) but concluded that clinically this difference may be unimportant.<sup>10</sup> Overall there is a lack of clear evidence on the best method of local anaesthesia for minor gynaecological procedures, including abortion.9-11

We did not include conscious sedation as part of our procedure as we aimed to introduce a technique that is safe and suitable for an outpatient setting where anaesthetist support is not available and that would allow women to leave the service directly, without requiring a supervising adult.

# CONCLUSIONS

The technique we use for MVA is highly effective throughout the first trimester, with low pain scores, a low complication rate and high acceptability. It combines all the advantages of a surgical procedure with low cost.

Although we did not set out to compare MVA with medical abortion, our experience with both procedures indicates that medical methods seem to be less effective and more painful compared to first-trimester surgical abortion with local anaesthetic. Arguably MVA is therefore a gold standard procedure for the first trimester.

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Competing interests None.

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### Correction

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Pillai M, Welsh V, Sedgeman K, Gazet A C, Staddon J, Carter H. Introduction of a manual vacuum aspiration service: a model of service within a NHS Sexual Health Service. *J Fam Plann Reprod Health Care* 2015;41:27–32 doi:10.1136/jfprhc-2013-100700 The lead author would like to apologise for an error in the description of the MVA aspirator. The device used in their service is the Ipas MVA Plus<sup>®</sup> Aspirator supplied by Durbin.

