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Infection after medical abortion: a review of the literature

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Abstract

Medical abortion regimens have become widely used, but the frequency of infection after medical abortion is not well documented. This systematic review provides data on infectious complications after medical abortion. We searched Medline for articles written before July 2003 to determine the frequency of infection after medical abortion up to 26 weeks of gestation. We reviewed all articles and extracted data on the frequency of infection from 65 studies. The frequency of diagnosed and/or treated infection after medical abortion was very low (0.92%, N = 46,421) and varied among regimens. Results of this review confirm that, with respect to infectious complications, medical abortion is a safe and effective option for first- and second-trimester pregnancy termination. After accounting for regional variations in diagnosis, there is little difference in frequency of infection among the regimens reviewed. Future studies should report clear diagnosis and treatment standards for infection so that more precise information becomes available.

Keywords: Medical abortion; Infection; Mifepristone; Misoprostol; Antibiotics

1. Introduction

Over the past decade, medical abortion regimens have become more widely used to terminate first- and second-trimester pregnancies. From November 2000 to May 2002, an estimated 80,000 women received mifepristone for medical abortion in the United States [1] and over 15 million medical abortions were performed in China from 1992 to 2002 [2]. Regimens using mifepristone accounted for approximately half of the first-trimester abortions performed in France, Scotland and Sweden, and 18% of the first-trimester abortions in England and Wales from 1990 to 2000 [3]. These methods offer women safe, effective and acceptable alternatives to surgical procedures. It is important, however, to understand the frequency of complications after medical abortion and to develop proper management and treatment guidelines in order to provide high-quality care for patients seeking treatment.

Infections requiring oral or intravenous antibiotic treatment and/or hospitalization sometimes occur after surgical abortion, childbirth and invasive procedures involving the female genital tract. Postpartum infection is estimated to occur 6.0–7.4% of the time after cesarean sections and 5.5% after vaginal deliveries [4], and pelvic infections are the most common complication of surgical abortion procedures, with frequencies varying from 0.1% to 4.7% worldwide [5]. Risk of developing infection is a particular concern for providers, because they are keen to avoid serious complications that may jeopardize the health and future fertility of the predominately young and healthy women they treat.

Because medical abortion is a noninvasive procedure, there is an expectation that infection after medical abortion could be less frequent than after surgical abortion. Indeed, data from both Hausknecht [1] and Planned Parenthood (Mary Fjerstad, Planned Parenthood Federation of America, personal communication) suggest the frequency of infectious complications after mifepristone medical abortion is very low (considerably less than 1%). Based on US Food and Drug Administration (FDA) adverse event reports related to the use of mifepristone (Mifeprex®), a 2003 review by Hausknecht found reports from 10 (out of an estimated 80,000) women (0.013%) in the United States who underwent medical abortion treatment with mifepristone who were treated with antibiotics for infections, one of which was serious [1,6]. A review of clinic-based data from the Planned Parenthood Federation of America found that 13 cases of endometritis requiring intravenous antibiotics and

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hospitalization were diagnosed among the 58,950 women receiving mifepristone medical abortion between January 1, 2001, and June 30, 2003 (0.022%) (Mary Fjerstad, Planned Parenthood Federation of America, personal communication).

Nonetheless, it is not possible to make accurate estimates about rates of infection after medical abortion from these data, because of two key but distinct issues. First, data based on regulatory reports are generally presumed to underestimate the true incidence of an event, as reporting is voluntary and unsolicited. Second, data from Planned Parenthood represent only one clinic system, and thus it is not possible to generalize from those results to the population of all medical abortion providers in the United States. The purpose of this review is to provide more systematic data on infectious complications after the five most common medical abortion regimens.

2. Materials and methods

In order to analyze the frequency of infection after medical abortion for early pregnancy termination, we searched the Medline database for articles written in English before July 2003 with the following indexing terms: medical abortion, mifepristone, misoprostol, methotrexate, abortion and pregnancy termination.

We used the following selection criteria for study inclusion: (a) sample size greater than 100 (although for randomized trials, the sample size for a particular study arm could be less than 100), and (b) the inclusion of reports on the frequency of infection following the medical abortion procedure by specific treatment regimen. Articles selected included reports of prospective, retrospective and randomized studies. The population for all studies was women who received medical abortion treatment for pregnancy termination in the first or second trimester. Frequency of infection was the outcome of interest for our review. We were careful to exclude studies reporting on data that overlapped with other studies. Using this methodology, we retrieved 85 prospective studies and randomized clinical trials, 74% of which met the inclusion criteria for our review [7–69]. We also included data from two studies being prepared for publication (unpublished data from a study testing a mifepristone and three different misoprostol regimens in Canada, 2001; unpublished data from a study testing a mifepristone and oral misoprostol regimen in United States, 2002). The review encompassed studies of regimens using mifepristone and gemeprost, mifepristone and oral misoprostol, mifepristone and vaginal misoprostol, methotrexate and vaginal misoprostol, and vaginal misoprostol only, including a total of 46,421 women undergoing medical abortion procedures. Almost 95% of these women received medical abortion treatment before 12 weeks of gestation (94.5%, N = 46,421).

Few studies provided a rigorous definition of infection. Therefore, we included cases with confirmed diagnosis of infection and/or those treated with antibiotics for any reason, including for "presumptive" infection diagnosed based on the presence of prolonged bleeding, abdominal pain, offensive discharge and/or pyrexia.

3. Results

Overall frequency of diagnosed and/or treated infection reported after medical abortion treatment was <1% (0.92%, N = 46,421). Infections were reported after treatment, with a range of 0.00% to 6.11% among studies. The most common type of postabortal infection reported was endometritis (49%, 210/429), followed by undefined "genital tract infection" (37%, 159/429). Both types of infections were usually diagnosed with no confirmatory tests and treated with no sequelae. In over 46,400 patients receiving medical abortion treatment in these research studies, there was one report of death related to a rare case of *Clostridium sordellii* sepsis (0.002%) (unpublished data, 2001). There were four cases (0.009%) of infection requiring hospitalization, of which two were reported after treatment with mifepristone and vaginal misoprostol regimens, one after treatment with methotrexate and vaginal misoprostol, and one after treatment with mifepristone and oral misoprostol.

Infection was reported most frequently among women who received mifepristone followed by gemeprost (Table 1; 1.56%, n = 11,501). Of these cases, most (84%, n = 11,501) were "presumptive" infections treated with antibiotics without confirmed diagnosis. Frequency of infection after treatment with mifepristone and vaginal misoprostol (Table 1) was 1.33% (n = 15,292). The most common diagnosis among these women was "presumed genital tract infection" (77.5%, n = 204) based on clinical symptoms of continued pain, vaginal bleeding or offensive discharge, and all were treated with oral antibiotics. Another 15.2% of the infections were diagnosed as endometritis, and 3.4% were diagnosed based on the presence of fever. Six cases were treated with antibiotics, although no details of diagnosis were reported. One woman who also underwent laparoscopy for suspected ectopic pregnancy recovered fully from a pelvic infection. As described above, one death was reported as a case of *Clostridium sordellii* sepsis.

The frequency of infection among women treated with mifepristone and oral misoprostol regimens (Table 1; 0.21%, n = 13,497) was much lower. The vast majority (79%, n = 29) of cases were diagnosed as endometritis. Of the remaining cases, three were described as infections requiring only oral antibiotic treatment, one case was treated with intravenous antibiotics and hospitalization, one case was described as vaginitis and one diagnosis was unspecified. No other comments were reported on diagnosis, treatment or outcome for these remaining cases.

Among the 3893 women treated with methotrexate and vaginal misoprostol regimens (Table 1), 6 cases (0.15%) of

Table 1
Infection after medical abortion

Author	Year	Regimen	n	GA[a] (wks)	% Infection (n)
Regimen: Mifepristone (MP) and gemeprost (GP)					
Silvestre et al. [53]	1990	600 mg MP; 1 mg GP	2115	7	0.09 (2[b])
WHO Task Force [68]	1991	25 mg MP or 600 mg MP; 1 mg GP	385	7	3.64 (14[c])
WHO Task Force [67]	1993	200, 400 or 600 mg MP; 1 mg GP	1151	8	1.39 (16[d])
UK Multicenter Study Group [59]	1997	600 mg MP; 1 mg GP, up to 5 doses	267	12	0.00 (0)
Urquhart et al. [60]	1997	600 mg MP; 1 mg GP	1018	9	0.00 (0)
Bartley et al. [13]	2000	200 mg MP, 0.5 mg GP	2839	9	4.30 (122[e])
Gemzell-Danielsson, Ostlund [32]	2000	600 mg MP; 1 mg GP, up to 5 doses	197	14–26	0.00 (0)
Bartley et al. [12]	2001	200 mg MP; 0.5 mg GP	453	9	5.74 (26[f])
Tang et al. [58]	2001	200 mg MP; 1 mg GP, up to 4 doses	956	12–24	0.00 (0)
WHO Task Force [65]	2001	200 or 600 mg MP; 1 mg GP	896	8–9	0.00 (0)
WHO Task Force [64]	2001	50 or 200 mg MP; 5 or 1 mg GP	1224	8	0.00 (0)
Total			11,501		1.56 (180)
Regimen: Mifepristone (MP) and vaginal misoprostol (MS)					
El-Refaey et al. [30]	1995	600 mg MP; 800 μg MS	133	9	0.00 (0)
Penney et al. [45]	1995	200 mg MP; 800 μg MS	360	9	6.11 (22[g])
Ho et al. [37]	1997	200 mg MP; 200 μg MS, up to 5 doses	49	14–20	0.00 (0)
Schaff et al. [52]	1997	600 mg MP; 800 μg MS	168	8	1.79 (3[h])
Ashok et al. [8]	1998	200 mg MP; 800 μg MS	2000	9	3.05 (61[i])
Gouk et al. [33]	1999	200 mg MP; 800 μg MS	313	9–12	0.32 (1[j])
Schaff et al. [51]	1999	200 mg MP; 800 μg MS	933	8	0.21 (2[k])
Aubeny, Chatellier [9]	2000	600 mg MP; 400 μg MS	118	7	0.00 (0)
Ngai et al. [43]	2000	200 mg MP; 400 μg MS, up to 5 doses	71	14–20	0.00 (0)
Schaff et al. [50]	2000	200 mg MP; 800 μg MS	2295	8	0.09 (2[l])
Schaff et al. [49]	2000	200 mg MP; 800 μg MS	1137	9	0.35 (4[m])
Bartley et al. [12]	2001	200 mg MP; 800 μg MS	457	9	5.47 (25[n])
Bjorge et al. [14]	2001	600 mg MP; 800 μg MS	226	9	0.44 (1[o])
Child et al. [24]	2001	200 mg MP; 800 μg MS	533	9	0.00 (0)
Knudsen [41]	2001	600 mg MP; 400 μg MS	100	8	2.00 (2[p])
Population Council study—Canada[gg]	2001	200 mg MP; 800 μg MS	318	8	0.63 (2[q])
Schaff et al. [48]	2001	200 mg MP; 800 μg MS	596	9	0.00 (0)
Ashok et al. [7]	2002	200 mg MP; 800 μg MS	4132	9	1.80 (76[r])
Schaff et al. [47]	2002	200 mg MP; 800 μg MS	522	9	0.19 (1[s])
Tang et al. [57]	2002	200 mg MP; 400 μg MS	100	9	0.00 (0)
Tang et al. [55]	2002	200 mg MP; 800 μg MS	100	9	0.00 (0)
Creinin et al. [26]	2003	200 mg MP; 800 μg MS	148	9	0.00 (0)
Hamoda et al. [35]	2003	200 mg MP; 800 μg MS	483	7–13	0.41 (2[t])
Total			15,292		1.33 (204)
Regimen: Mifepristone (MP) and oral misoprostol (MS)					
Aubeny et al. [10]	1991	600 mg MP; 400 μg MS	1208	7	0.08 (1[u])
McKinley et al. [42]	1993	200 or 600 mg MP; 600 μg MS	220	9	0.00 (0)
Peyron et al. [46]	1993	600 mg MP; 400 μg MS	505	7	0.00 (0)
Peyron et al. [46]	1993	600 mg MP; 400 μg MS, 200 μg MS	390	7	0.00 (0)
Guo-wei et al. [34]	1994	200 mg MP; 600 μg MS	149	7	0.00 (0)
Guo-wei et al. [34]	1994	50 mg MP, 25 mg MP; 600 μg MS	301	7	0.00 (0)
Aubeny et al. [11]	1995	600 mg MP; 400 μg MS	1108	7	0.27 (3[v])
El-Rafaey et al. [30]	1995	600 mg MP; 800 μg MS	130	9	0.00 (0)
Ho et al. [37]	1997	200 mg MP; 200 μg MS, up to 5 doses	49	14–20	0.00 (0)
Winikoff et al. [62]	1997	600 mg MP; 400 μg MS	1373	8	0.07 (1[w])
Spitz et al. [54]	1998	600 mg MP; 400 μg MS	2121	8	0.90 (19[x])
Jain et al. [40]	1999	600 mg MP; 400 μg MS	100	8	1.00 (1[y])
Ngoc et al. [44]	1999	600 mg MP; 400 μg MS	257	8	0.00 (0)
Aubeny, E Chatellier [9]	2000	600 mg MP; 400 μg MS	119	7	0.00 (0)
ICMR Task Force [38]	2000	200 mg MP; 600 μg MS	440	4	0.00 (0)
Ngai SW et al. [43]	2000	200 mg MP; 400 μg MS, up to 5 doses	71	14–20	0.00 (0)
WHO Task Force [66]	2000	200 or 600 mg MP; 400 μg MS	1589	5	0.00 (0)
Elul et al. [31]	2001	200 mg MP; 400 μg MS	315	8	0.00 (0)
Population Council study—Canada[gg]	2001	200 mg MP; 400 μg MS	319	8	0.94 (3[z])
Population Council study—Canada[gg]	2001	200 mg MP; 600 μg MS	319	8	0.00 (0)
Schaff et al. [48]	2001	200 mg MP; 400 μg MS, 2 doses	548	9	0.00 (0)

(Continued)

Table 1
continued

Author	Year	Regimen	n	GA[a] (wks)	% Infection (n)
Coyaji et al. [25]	2002	600 mg MP; 400 μg MS	874	9	0.00 (0)
Population Council study—US[gg]	2002	200 mg MP; 400 μg MS	353	7	0.28 (1[aa])
Schaff et al. [47]	2002	200 mg MP; 400 μg MS, 800 μg MS	489	9	0.00 (0)
Tang et al. [55]	2002	200 mg MP; 800 μg MS	50	9	0.00 (0)
Tang et al. [57]	2002	200 mg MP; 800 μg MS	100	9	0.00 (0)
Total			13,497		0.18 (29)
Regimen: methotrexate (MT) and vaginal misoprostol (MS)					
Hausknecht [36]	1995	50 mg IM MT; 800 μg MS	178	9	0.00 (0)
Creinin et al. [29]	1996	50 mg IM MT; 800 μg MS	300	7	0.00 (0)
Carbonell-Esteve et al. [23]	1997	50 mg IM MT; 800 μg MS	287	9	0.35 (1[bb])
Creinin et al. [28]	1997	50 mg oral MT; 800 μg MS	300	7	0.00 (0)
Wiebe [61]	1997	50 mg IM MT; 750 or 500 μg MS	289	7	0.00 (0)
Carbonell et al. [21]	1998	50 mg oral MT; 800 μg MS	300	9	1.00 (3[cc])
Creinin et al. [27]	1999	50 mg IM MT; 800 μg MS	240	7	0.00 (0)
Borgatta et al. [15]	2001	50 mg IM MT; 800 μg MS	1973	7	0.10 (2[dd])
Creinin et al. [26]	2003	50 mg IM MT; 800 μg MS	26	9	0.00 (0)
Total			3893		0.15 (6)
Regimen: vaginal misoprostol (MS) only					
Bugalho et al. [18]	1993	800 μg MS; 800 μg MS	169	12–23	0.00 (0)
Bugalho et al. [17]	1996	200 or 400 μg MS, up to 4 doses	134	11	0.00 (0)
Carbonell et al. [22]	1997	800 μg MS (moistened with water), up to 3 doses	141	10	0.00 (0)
Wiebe [61]	1997	600 μg MS, 3 doses	241	7	0.00 (0)
Wong et al. [63]	1998	400 μg MS, up to 5 doses	70	14–20	0.00 (0)
Carbonell et al. [20]	1999	800 μg MS (moistened with water), up to 4 doses	720	9	1.25 (9[ee])
Jain et al. [40]	1999	800 μg MS, 800 μg MS	100	8	1.00 (1[ff])
Bugalho et al. [16]	2000	800 μg MS	103	6	0.00 (0)
Carbonell et al. [19]	2001	1000 μg MS, up to 3 doses	300	7	0.00 (0)
Jain et al. [39]	2001	800 μg MS, up to 3 doses	100	8	0.00 (0)
Zikopoulos et al. [69]	2002	800 μg MS, up to 3 doses	160	8	0.00 (0)
Total			2238		0.45 (10)
Grand total			46,421		0.92 (429)

[a] Gestational age based on 1st day of last menstrual period.
[b] Case 1: Endometritis; Case 2: Salpingitis; no comments given on care or outcome.
[c] Antibiotic therapy given to prevent or cure suspected genitourinary infection.
[d] Antibiotics given for suspected pelvic or upper genital tract infections.
[e] Diagnosed with presumed endometritis by clinical symptoms.
[f] Given antibiotics for clinically diagnosed endometritis.
[g] 20 women given antibiotics for prolonged bleeding or offensive discharge; 2 women with pyrexial illness given IV antibiotics, 1 to 3 days after medical abortion.
[h] Endometritis; no details on treatment.
[i] Given antibiotics for presumed genital tract infection (symptoms: continued pain, vaginal bleeding, offensive discharge).
[j] Pyrexia treated with antibiotics.
[k] Mild endometritis, given oral antibiotics.
[l] Antibiotics.
[m] Antibiotics.
[n] Given antibiotics for clinically diagnosed endometritis.
[o] One woman required surgical intervention due to abdominal pain and suspected infection; treated with antibiotics.
[p] 2 patients with "pyrexia, pain, discharge" given antibiotics and evacuation.
[q] One report of death related to a rare case of *Clostridium sordelli* sepsis; one case treated with oral antibiotics.
[r] 66 women with presumed genital tract infection based on symptoms (continued pain, vaginal bleeding, offensive discharge) treated with antibiotics; 10 women had unscheduled visits to hospital and were treated with antibiotics for presumed infection.
[s] Endometritis treated with oral antibiotics.
[t] Pyrexia (Temperature >38°C).
[u] Vaginitis.
[v] Endometritis.
[w] Unspecified; visited another hospital for "infection".
[x] Endometritis with one severe case.
[y] Endometritis.
[z] Infections treated with oral antibiotics.
[aa] Treated with IV antibiotics and hospitalization.
[bb] 1 presumptive septic endometritis with remains; no comments on treatment.
[cc] 3 presumptive septic endometritis with remains; given antibiotics.
[dd] Two women had postabortal infections, one requiring hospitalization.
[ee] Given antibiotics.
[ff] Endometritis.
[gg] Population Council, unpublished data.

Table 2
Aggregate frequencies

Regimen	Overall			UK studies			Non-UK studies		
	N	n	%	N	n	%	N	n	%
Mifepristone and vaginal misoprostol	15,292	204	1.33	8471	187	2.21	6,821	17	0.25
Mifepristone and oral misoprostol	13,497	29	0.21	350	0	0.00	13,147	29	0.22
Mifepristone and gemeprost	11,501	180	1.57	4381	148	3.38	7120	32	0.45
Methotrexate and vaginal misoprostol	3893	6	0.15	0	0	0.00	3893	6	0.15
Vaginal misoprostol alone	2238	10	0.45	0	0	0.00	2238	10	0.45
Total	46,421	429	0.92	13,202	335	2.54	33,219	94	0.28

infection were reported. Four cases were diagnosed as presumptive endometritis (three of whom were treated with antibiotics), and two cases were reported without diagnostic details. Frequency of reported postabortal infection among women who received regimens of misoprostol (vaginally) only (Table 1) was similarly low (0.45%, n = 2238). One case was defined as endometritis, and nine cases were not described beyond having received antibiotic treatment.

Out of 46,421 women described in these studies, 930 women were treated with medical abortion regimens late in the first trimester (10–14 weeks gestation). Three of the 930 women (0.32%) were treated for infectious complications. There were no infections reported among the 1632 women treated in the second trimester (14–26 weeks gestation).

Regional variation in diagnostic criteria and treatment procedures may affect the reported frequency of infection after medical abortion procedures. When data were analyzed according to region, frequency of infection in the UK studies was higher than that in studies carried out elsewhere (Table 2). For example, frequency of postabortal infection in women who received mifepristone and vaginal misoprostol in the United Kingdom is almost 10 times higher than that reported among women receiving the same method of treatment outside of the UK (2.21%, n = 8471 and 0.25%, n = 6821, respectively; $p < 0.0001$). Further, although studies from the United Kingdom make up only 55% of the data on regimens using mifepristone and vaginal misoprostol, they account for 92% of the infections reported after treatment with this regimen. Reports of infection in the large series of mifepristone and gemeprost studies performed in the United Kingdom manifest the same pattern: standard treatment for "presumptive" infections and a higher than average reported frequency of infection (3.38%, n = 4381 in UK studies as compared to 0.45%, n = 7120 in non-UK studies; $p < 0.0001$)

In contrast, reported frequency of postabortal infection in studies both of methotrexate and vaginal misoprostol and of mifepristone and oral misoprostol are lower than the overall average (0.15% and 0.21%, respectively, as compared to the overall frequency of 0.92%, $p < 0.0001$ for both differences). Studies including oral misoprostol administration were carried out predominantly in France and the United States (only 2.6% of such patients were treated in the UK), and methotrexate studies were carried out predominantly in Canada and the United States (no patients treated in the UK).

Excluding data from the UK studies (n = 13,302), the overall frequency of infection after all medical abortion regimens decreases from 0.92% to 0.28% ($p < 0.0001$). Additionally, when the UK data are excluded, there appears to be essentially no difference between frequencies of infection for the two routes of prostaglandin administration (0.25% after vaginal administration and 0.22% after oral; $p = 0.081$). Therefore, it is very likely that there is no meaningful difference in infection frequency by route of administration of misoprostol.

4. Discussion

As this review of studies examining five types of medical abortion regimens clearly demonstrates, overall frequency of reported infection after medical abortion procedures (0.92%) is lower than that reported after either surgical abortion procedures or childbirth. The rate of women lost to follow-up was quite low (<5%) in most of the studies we reviewed. Therefore, it is unlikely that loss to follow-up affected the reported frequency of infection. Several other methodological issues, however, do limit the analysis of infection after medical abortion in this review. Most important, many different definitions and diagnostic standards for infection were used in the studies evaluated.

Treatment with any type of postprocedural antibiotic (oral or intravenous) most commonly served as a proxy for diagnosis of infection. Antibiotics were often given for "presumptive" diagnoses based on one or more of the after symptoms: prolonged bleeding, abdominal pain, offensive discharge and pyrexia, especially in certain medical cultures. While treatment of presumptive infection may be an appropriate standard of care, using such treatment as a proxy for infection likely results in an overestimate of the true frequency of infection. Furthermore, some of the recorded use of antibiotics could derive from prophylactic antibiotics before surgical completion of failed medical abortions, adding to the overestimate of the true frequency of infection after medical abortion.

Regional differences in the reported frequency of infection may be evidence that the diagnosis and treatment of

infection depends heavily on medical practice and physician behavior. This inconsistency limits our ability to calculate a true frequency of infection after medical abortion. There is some evidence that regional variation in clinical practice may impact reported frequency of infection, as the overall frequency of infection (0.92%) is much lower than the frequency reported in the UK studies (2.54%).

Indeed, overall frequency of infection may be elevated because antibiotic treatment is standard practice for "presumptive" infection signaled only by prolonged bleeding or pain in the United Kingdom. In comparison, in France, the United States and Canada, treatment of presumptive infections is not commonly reported. This difference—between treatment of infection in the United Kingdom and other regions—is one possible explanation for the lower frequency of infection for the two regimens tested predominantly outside of the United Kingdom, mifepristone and oral misoprostol and methotraxate and vaginal misoprostol. In fact, when studies from the United Kingdom were excluded, there were no significant differences in frequency of infection among the regimens. Therefore, the relatively higher infection frequencies reported after treatment with mifepristone and vaginal misoprostol or gemeprost may be artifacts of diagnostic bias from studies conducted in the United Kingdom.

Infection after medical abortion procedures is an infrequent event, occurring in $<1\%$ of over 46,400 cases, substantially lower than the frequency of infection after surgical abortion. Data from a review of serious adverse events reported to the FDA [1] and from a series of almost 59,000 women treated in Planned Parenthood clinics (Mary Fjerstad, Planned Parenthood Federation of America, personal communication) suggest that the frequency of serious infection after medical abortion treatment is extraordinarily low (0.013% and 0.022%, respectively). Although it is likely that infections with no serious sequelae are undercounted in these types of reporting systems, this current review of a large series of cases suggests that serious infections are, indeed, quite rare.

Although infectious complications of medical abortion appear to be infrequent, providers should be certain to inform patients undergoing medical abortion procedures of the warning signs and symptoms of postabortal pelvic infection, including fever, abdominal pain and/or tenderness, prolonged bleeding and foul vaginal discharge. In addition, providers should emphasize the importance of returning for follow-up care if there is any question of infection.

When postabortal infections develop after a medical abortion procedure, they are usually treated with oral antibiotics and rarely result in a serious medical event. The fact that medical abortions have very low infection frequencies may be especially important for areas where safe surgical abortion services are not available, such as clinical settings in developing countries. Future studies should be vigilant about diagnostic, treatment and reporting standards for infection so that more precise frequencies can be calculated and safer and more effective treatment regimens can be established. Results of this review confirm that, with regard to infectious complications, medical abortion treatments appear to be safe and effective options for terminating early pregnancies.

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