	No in group	Median age (years)	No (%) nulliparous	Median age at menopause (years)	Median age at onset of symptoms (years)	Median age at referral (years)	No (%) who had had hysterectomy	Median age at hysterectomy (years)	Median time from hysterectomy to referral (years)
Osteoarthritis group	292	58	52 (18)	49.5	49	53	82 (28)*	42	6 years
Rheumatoid arthritis group	270	59	71 (27)	49.5	48	50	39 (14)*	45	4 years
Electoral register population	243	50	33 (14)	50			37 (15)	43	
Local general practice population	346	54	71 (20)	50			38 (11)	41	

*Sixty three (77%) and 25 (64%) hysterectomies were carried out at least one year before referral to hospital in the osteoarthritis and rheumatoid arthritis groups respectively.

implied that the indications for surgery might be more important than surgery itself. There are several potential biases. Early symptoms in women with osteoarthritis may have been misinterpreted and resulted in hysterectomy. This is unlikely given the long median delay (six years) between operation and diagnosis and that those with spinal osteoarthritis did not have the greatest rate of hysterectomy. The difference in rate of hysterectomy between the women with osteoarthritis and those with rheumatoid arthritis may have been due to fewer gynaecological abnormalities occurring in those with rheumatoid arthritis. Previous studies found no difference between women with rheumatoid arthritis and controls,² and the rates of hysterectomy in women with rheumatoid arthritis were similar to those in our population controls. By contrast, a link between hysterectomy and predisposition to osteoarthritis is biologically plausible. Dysfunctional uterine bleeding and fibroids, the main reasons for hysterectomy in our study, have both been attributed to an excess of oestrogens.³ Oestrogens have also been found to affect adversely several different animal models of osteoarthritis,⁴ possibly by affecting turnover of proteoglycan.

Our results suggest that although osteoarthritis undoubtedly has a multifactorial aetiology, an underlying imbalance of oestrogen may be responsible for both the gynaecological problems and the development, several years later, of osteoarthritis.

We thank the consultants in rheumatology and staff of the following for their cooperation and help: St Bartholomew's Hospital, The London Hospital, Homerton Hospital, Whipps Cross Hospital, Wanstead Hospital, St Andrew's Hospital, and Wapping Health Centre. We also thank Dr Eve Roman of the London School of Hygiene and Tropical Medicine for giving us access to data on the controls obtained from the electoral register.

1 Lawrence JS. *Rheumatism in populations*. London: Heinemann, 1977.
2 Short CL, Bauer W, Reynolds WG. *Rheumatoid arthritis*. Cambridge, Massachusetts: Harvard University Press, 1957.
3 Studd J, Thom MH. Oestrogens and endometrial cancer. In: Studd J, ed. *Progress in obstetrics and gynaecology*. Vol 1. Edinburgh: Churchill Livingstone, 1981:183-98.
4 Rosner IA, Goldberg VM, Moskowitz RW. Estrogens and osteoarthritis. *Clin Orthop* 1986;213:77-83.

(Accepted 10 June 1988)

Suppression of ovulation by transdermal oestradiol patches

N R Watson, J W W Studd, A F Riddle, M Savvas

Premenstrual Syndrome Clinic, Department of Obstetrics and Gynaecology, Dulwich Hospital, London SE22 8PT
N R Watson, MB, research fellow
J W W Studd, MD, consultant gynaecologist
A F Riddle, MRCOG, senior registrar
M Savvas, MRCOG, senior registrar

Correspondence to: Mr Studd.

Percutaneous oestrogen is a well tolerated and highly acceptable treatment for symptoms of the menopause. The percutaneous route avoids first pass liver metabolism and the associated changes in hepatic proteins that occur with oral treatment,¹ particularly with ethinyloestradiol and mestranol, the oestrogens in the contraceptive pill thought to be associated with morbidity. This study was undertaken to determine the effect of transdermal oestradiol patches on ovulation.

Patients, methods, and results

Ten women attending this clinic (mean age 35) who had a regular cycle (28-30 days) and were not using hormonal contraception were selected for the study. They were monitored for four cycles. The first cycle was without treatment to confirm ovulation. Subsequently they were treated with two 100 µg

transdermal oestradiol patches every three days from the first day of menstruation for three cycles. Monitoring was by ultrasonography on alternate days and assay of luteal phase progesterone and oestradiol concentrations. When the study was completed the patients had an endometrial biopsy and were started on cyclical progestogens to correct excess endometrial proliferation.

The table summarises the results. During the control cycle follicular rupture occurred in all patients, the mean progesterone concentration was 30 nmol/l (range 13-81), and the mean length of the cycle was 28.5 days (27-30). During the first treatment cycle follicular rupture occurred in one patient and in another a follicle developed to 12 mm but did not rupture. The serum progesterone concentrations in these two patients were 7.4 and 34.2 nmol/l respectively. In the remaining patients follicles never exceeded 10 mm and serum progesterone concentration was less than 1 nmol/l. During the remaining two cycles follicles never exceeded 10 mm diameter and progesterone concentrations remained less than 2 nmol/l. Vaginal bleeding occurred only in the patient who ovulated and in the final cycle, when four patients had irregular spotting. Histological examination showed endometrial cystic hyperplasia in three biopsy specimens and normal proliferative endometrium in the seven others.

Comment

This study shows that oestradiol patches will suppress ovulation and may be effective for contraception. Experience with subcutaneous oestradiol implants suggests that they will completely suppress ovulation only after three months,² but only five pregnancies have been reported in 7099 treatment cycles and four of these occurred within six months

Effects of transdermal oestradiol patches on ovulation

	Before treatment	1st Month	2nd Month	3rd Month
No who ovulated	10	1		
No who menstruated (day)	10 (27-30)	1* (28)		Spotting
Mean (range) oestradiol (nmol/l)	0.37 (0.2-0.5)	0.58 (0.2-0.9)	1.1 (0.2-2.9)	0.62 (0.3-0.8)
Mean (range) progesterone (nmol/l)	30.1 (13-81)	2.6 (0.2-7.4)*	0.4 (0.1-1.0)	0.4 (0.1-0.9)

*Progesterone concentration in the patient who ovulated was 34 nmol/l.

after the first implant.¹ The rapid increase in oestradiol concentration and earlier suppression of ovulation that occur with patches suggest that they may be even more effective than implants; they are also easier to discontinue.

The avoidance of first pass liver metabolism is an advantage of patches as serious side effects or oral contraceptives have been attributed to altered hepatic function. Even with low dose pills adverse changes in lipoproteins have been reported,² yet with percutaneous preparations no measurable changes occur in lipids or in the clotting and fibrinolytic systems.¹ Though no epidemiological studies have shown that alterations in liver metabolism are detrimental, it seems prudent to prescribe treatment with the least effect on the liver. Another advantage of patches is that they only have to be changed twice a week.

As oestradiol patches are licensed for treatment of

symptoms of the climacteric they would be ideal as a method of contraception for women over 35 and as treatment for women with cyclical problems of the premenstrual syndrome, which particularly occur in this age group. In clinical practice progestogens must be given for seven to 10 days each month to induce a withdrawal bleed to prevent endometrial hyperplasia.³

- 1 Chetkowski RJ, Meldrum DR, Steingold KA, *et al*. Biologic effects of transdermal estradiol. *N Engl J Med* 1986;314:1615-20.
- 2 Magos AL, Collins WP, Studd JWW. Effects of subcutaneous oestradiol implants on ovarian activity. *Br J Obstet Gynaecol* 1987;94:1192-8.
- 3 Greenblatt RB, Asch RH, Mahesh VB, Byrne JR. Implantation of pure crystalline pellets of estradiol for conception control. *Am J Obstet Gynecol* 1977;127:520-4.
- 4 Burkman RT, Robinson JC, Kruszon-Morgan D, Kimball AW, Kwiterovich P, Burlord RG. Lipid and lipoprotein changes associated with oral contraceptive use: a randomized clinical trial. *Obstet Gynecol* 1988;71:33-8.
- 5 Studd JWW, Magos AL. Hormone pellet implantation for the menopause and pre-menstrual syndrome. *Obstet Gynecol Clin North Am* 1987;14:229-49.

(Accepted 14 July 1988)

Antibiotics carried in general practitioners' emergency bags

Edmund L C Ong, Edward M Dunbar

Department of Infectious Diseases and Tropical Medicine, Monsall Hospital, Manchester M10 8WR

Edmund L C Ong, MRCP, registrar
Edward M Dunbar, MRCP, consultant

Correspondence to: Dr Ong.

Numbers of respondents (n=115) who carried various antibiotics in their emergency bags. All drugs were oral preparations unless indicated otherwise; figures in parentheses are numbers carrying parenteral preparations

Antibiotic	No
<i>Penicillins</i>	
Ampicillin	73 (2)
Amoxycillin	34
Augmentin	6
Benzylpenicillin	3 (52)
Flucloxacillin	27
Phenoxyethylpenicillin	24
Benethamine penicillin	(2)
<i>Cephalosporins</i>	
Cephalexin	15
Cephadrine	21
Cefaclor	23
Cefadroxil	1
Cefuroxime	3
<i>4-Quinolones</i>	
Ciprofloxacin	12
Nalidixic acid	6
<i>Sulphonamides</i>	
Co-trimoxazole	79
Sulphadimidine	1
Sulphadiazine	1
<i>Aminoglycosides</i>	
Gentamicin*	1
Neomycin	1
<i>Others</i>	
Erythromycin	112
Tetracycline	34
Trimethoprim	24
Metronidazole	18
Chloramphenicol†	12
Nitrofurantoin	3

*Topical preparation.

†In addition three respondents carried topical chloramphenicol.

The contents of a general practitioner's emergency bag are important, especially when general practitioners are faced with, for instance, meningococcal infection that may strike with such devastating speed that the early use of parenteral penicillin may be life saving. With this in mind we conducted a postal survey asking general practitioners which antibiotics they carried. The survey was conducted shortly after the chief medical officer sent out a letter informing all doctors about meningococcal infection.¹

Methods and results

We compiled a one page questionnaire containing lists of common antibiotics so that general practitioners could tick the ones that they kept in their bags. We posted this questionnaire, together with patients' discharge letters and letters from clinics, to general practitioners whose patients had attended this department between 1 March and 30 April 1988. The survey was anonymous, and we did not refer to the chief medical officer's letter.

Of the 180 questionnaires sent out, 115 were returned, giving a response rate of 64%. The mean age of the general practitioners who responded was 41.3 years (range 26-67). One hundred of the respondents were principals (three trainees) and 15 trainees. Altogether 113 had antibiotics in their bags; two principals did not carry any. The mean number of antibiotics carried was 5.3 (range 0-14). One hundred and nine respondents carried penicillin preparations and 56 parenteral penicillin. The most common antibiotic carried was oral erythromycin (112 doctors) followed by oral co-trimoxazole (79) and oral ampicillin (73) (table).

Of the 34 respondents who were members of the Royal College of General Practitioners, only 22 carried parenteral penicillin. One of the three trainees and six of the 14 trainees did not carry it.

We did not assess whether our respondents were typical of all general practitioners in Manchester.

Comment

We believe that this is the first study of the drugs that general practitioners keep in their emergency bags. We

surveyed the range of antibiotics because we have become increasingly concerned that general practitioners are not aware that the use of parenteral penicillin in meningococcal infection before transfer to hospital, especially in the presence of a haemorrhagic rash, may be life saving. Previous inquiries indicated that deaths from meningococcal infections were due to delayed diagnosis and treatment.^{2,3}

Our questionnaire was sent out less than four weeks after the chief medical officer's letter was posted to all doctors in the United Kingdom, and yet only 49% of our respondents had parenteral penicillin in their emergency bag. It might be argued that our survey was biased because we sent the questionnaires with patients' discharge summaries and follow up letters to clinics; such bias would mean that our results are an overestimate of the proportion of general practitioners keeping parenteral penicillin in their bag. Moreover, those who replied were likely to be more motivated and thus may have been atypical.

We are encouraged that most general practitioners (98%) carried antibiotics. The overall abundance of cephalosporins (53%) is worrying as it probably reflects common use in the community. Each general practitioner must decide which drugs he or she requires in the emergency bag; antibiotics such as parenteral benzylpenicillin should be included, and erythromycin, ampicillin, and co-trimoxazole are commonly also recommended.⁴

This study suggests that more needs to be done to educate general practitioners about the early use of parenteral penicillin in meningococcal infection. In the outbreak of meningococcal disease in Gloucestershire between October 1981 and March 1986 antibiotics were given before admission to hospital in only six out of 65 cases documented.⁵ In another study none of the 86 patients who died from meningococcal infection received any intravenous antibiotics before arrival in hospital.² Parenteral penicillin should be readily available for immediate administration.

We thank all those general practitioners who returned completed questionnaires. The survey was partly supported by the John Hamilton Fund.

- 1 Chief Medical Officer. *Meningococcal infection: meningitis and septicaemia*. London: Department of Health and Social Security, 1988. (PL/CMO/88/2.)
- 2 Slack J. Deaths from meningococcal infection in England and Wales in 1978. *J R Coll Physicians Lond* 1982;16:40-4.
- 3 Oakley JR, Stanton AN. Meningococcal infection during infancy: confidential inquiries into 10 deaths. *Br Med J* 1979;iii:468-9.
- 4 Moulds AJ, Martin PB, Bouchier-Hayes TAI. *Emergencies in general practice*. Lancaster: MTP Press Limited, 1983.
- 5 Cartwright KAV, Stuart JM, Noah ND. An outbreak of meningococcal disease in Gloucestershire. *Lancet* 1986;ii:558-61.

(Accepted 21 June 1988)