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Benefits and risks of the various contraceptive methods. A literature review

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INTRODUCTION

Ever since contraception was legalized in France by the 1967 Neuwirth law, the prescription of contraceptive products has continued to climb[1]. In 2013, 97% of women of childbearing age, in a couple and without a wish to become pregnant were using at least one means of contraception[2]. The French contraception model is particularly centered on oral contraception, which represented 43% of the contraception methods utilized in 2013, far outnumbering intrauterine devices (25%) and male condoms (13%)[2].

In France there exists a paradox between on the one hand intensive use of contraception methods and on the other hand frequent recourse to emergency contraception (the "morning after" pill) and voluntary termination of pregnancy (abortion). In 2010, 47% of women from 20 to 24 years of age stated that at least once, they had availed themselves of emergency contraception[2]. One out of every three pregnancies is considered as unplanned, leading in 60% of cases to an abortion, and two out of three unintended pregnancies occur in women using contraceptives[3]. Each year, approximately 1.5% of potentially childbearing women undergo abortion, and the French institute of demographic studies (Ined) has estimated that 1 out of 3 women undergoes abortion over the course of her reproductive life. Even though abortion frequency has remained stable, the proportion of repeated abortions has steadily grown[4,5]. Abortions are particularly frequent in women from 19 to 25 years of age4, in French overseas departments, in the Paris area, and in southern France[6].

This paradox results to a large extent from a mismatch between women's needs and the contraception solutions at their disposal[5,7]. An information campaign on the available methods is needed in order to facilitate patient adherence and to improve prevention of unwanted pregnancies. The objective of the present review was to describe the contraceptive (prevention of unwanted pregnancies) and non-contraceptive (therapeutic and preventive) benefits and risks (particularly metabolic, vascular or cancer-related) of the different contraception methods.

METHODS

This review of the literature was carried out by consulting the Medline database and the Cochrane Library for material

published from 1995 to 2014. The search was completed by the identification of secondary references. The different steps were undertaken by KK, with the help of LL in situations of uncertainty.

Identification of the articles

In the Medline data base, the articles fulfilling the following criteria were included:

-"agents, female contraceptive" [MeSH terms] AND "Pearl Index" [Title/Abstract] concerning contraceptive efficacy, with the following filters: clinical trials and meta-analyses, with no restriction in time;

-"agents, female contraceptive/therapeutic use" [MeSH terms] concerning non-contraceptive benefits, with the following filters: clinical trials and meta-analyses, published between 1 January 1995 and 31 December 2014 in the leading clinical reviews;

-"agents, female contraceptive/adverse effects" [MeSH major topic] concerning adverse effects, with the following filters: original articles and meta-analyses, published between 1 January 1995 and 31 December 2014 in the leading clinical reviews.

In the Cochrane Library, the articles included corresponded to the following criteria: "contraceptive" [Keywords] AND "female" [Keywords] with the following filter: Cochrane reviews.

Article exclusion criteria

The articles excluded corresponded to the following criteria: non-systematic review, protocol, didactic article, letter to the editor, article without abstract, cross-sectional study, animal study; lack of evaluation of contraceptives for women in the primary endpoint; evaluations limited to contraceptives for men; lack of evaluation of the contraceptive efficacy and the non-contraceptive benefits or risks of contraceptives for women in the primary endpoint; evaluation of contraceptives for women in sub-groups of patients suffering from a chronic disease; study of minors under 15 years of age or post-menopausal women; studies of the action mechanism of contraception methods; evaluation of drug interactions or comparison to non-contraceptive drugs.

Data extraction

The indicators measured for therapeutic efficacy were the theoretical (evaluated in trials) and practical (measured in real conditions of use) Pearl indexes (PI). They were expressed in terms of either the confidence interval of a contraception method, or the width of the confidence intervals of several methods. Non-contraceptive benefits and adverse effects were reported in the form of relative risks (RR), odds ratios (OR), or differences in average efficacy or excessive risk (triangle). RR, OR and the triangle were all expressed with a 95% confidence interval (CI95). When available, the absolute risks (AR) of the adverse effects were given priority. When the data from different studies with regard to a given primary endpoint were available, those originating in the most recent studies or those with the highest level of evidence were given priority. Except in exceptional cases, only the RR and OR comparing a group exposed to a group not exposed to the contraception method (placebo or untreated group) were presented. The results were systematically rounded down to the first decimal place. Overlap of the confidence intervals of the benefit or risk indicators signified an absence of significant statistical difference between two groups.

RESULTS

All in all, 687 articles were identified on the basis of the inclusion criteria. After elimination of duplicates, application of the exclusion criteria and the addition of 27 secondary references, the review involved 377 articles (**Figure 1**).

Contraceptive efficacy (Table 1)

When a contraception method was correctly and consistently used, the number of pregnancies per 100 women after 12 months of utilization (theoretical Pearl index) was found to be minimal with hormonal contraception methods, intrauterine devices (IUD) and tubal ligation (between 0.1 and 1.0), and maximal with barrier methods (between 2 and 26). The gap separating theoretical from practical efficacy has been shown to be particularly wide as regards: a) so-called natural methods, practical Pearl index between 22 and 25 (difficulties in self-observation); b) the male condom, 15 (ruptures or ill-fitting condoms); c) oral contraception, 9 (forgetfulness); d) injectable progestin, 6 (reasons largely unknown). IUDs and contraceptive implants are currently considered as the two most effective reversible contraception methods[8-11].

A Cochrane review comparing the contraceptive efficacy of combined oral contraceptives (COC) associating 30 to 50 mg of ethynilestradiol (EE) with 150 mg of desogestrel and 20 mg of EE did not reveal any significant difference in theoretical contraceptive efficacy12. Moreover, recent Cochrane reviews have not shown any difference in efficacy between COCs containing

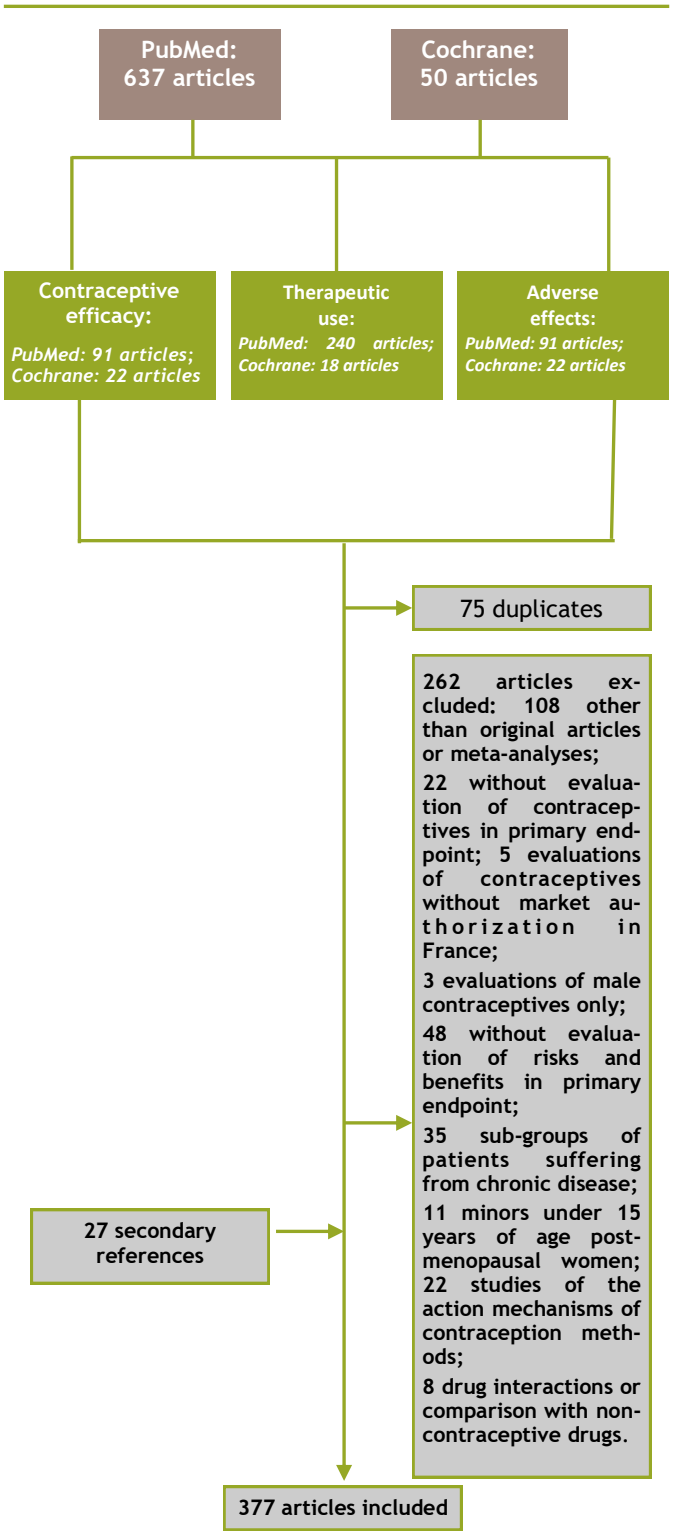

Figure – Flow diagram of the articles included

hormone doses that vary during a menstrual cycle (monophasic to quadiphasic forms)[13-16]. Nor was there any difference in efficacy between COCs and progestogen-only pills[8].

A meta-analysis of two clinical trials showed pregnancy rates following administration of levonorgestrel (NorLevoR) and ulipristal acetate (EllaOneR) to be 2.2% and 1.4% respectively in women treated from 0 to 72 hours (p = 0.046; no measurement of heterogeneity)[17]. According to the results of one of these trials, only ulipristal acetate effectively precluded all risk of pregnancy occurrence from 72 to 120 hours (no pregnancies in 97 women using ulipristal acetate vs. 3 pregnancies in 106 women using levonorgestrel; p = 0.037). As for the copper intrauterine device, it also functioned as effective emergency contraception in cases where durable contraception was desired, provided that it was inserted at most five days after high-risk sexual intercourse18. The effectiveness of emergency oral contraception in overweight or obese women is reduced[19].

Therapeutic efficacy (Table 2)

In a review of nine trials, all of them showed a reduction in number of lesions and acne severity using COC, with no objectified difference between generations. More precisely, in a meta-analysis of two trials, COCs containing levonorgestrel reduced by 3 to 17 the number of acne lesions over an average duration of 6 months (I^2 = 0%) 20. The effect on acne of a transdermal patch and a vaginal contraceptive ring is highly likely to be comparable to that of similarly formulated third-generation pills. As regards progestogen-only pills, no benefit is to be expected on account

of their androgenic properties or non-hormonal devices.

A meta-analysis of seven randomized studies demonstrated the efficacy of COC with regard to primary dysmenorrhea, with overall OR ranging from 0.3 to 0.8 (I^2 = 64%, with an overall odds ration ranging from 0.2 to 0.6; I^2 = 0 after exclusion of studies presenting treatment allocation abnormalities)[21]. A one-off study suggested that third-generation were more beneficial than second-generation COCs, with the OR between the two generations ranging from 0.2 to 0.8[21]. The effect on primary dysmenorrhea of the transdermal patch and the contraceptive ring is quite arguably comparable that of third-generation pills. If no result on progestogen-only pills has been reported, this is probably due to the fact that more often than not, they provoke amenorrhea.

A systematic review of ten studies revealed an average reduction of menorrhagias (loss of at least 80 ml per cycle) ranging from 77% to 94% at three months and from 79% to 97% at one year using a levonorgestrel IUD[22]. Another systematic review drew attention to reduction in bleeding of 87% at three months with progestogen-only pills (one-off study) and from 35% to 68% at one year with COC[23].

Contraception method	Pearl index	
	Theoretical mean or [minimum; maximum]	Practical mean or [minimum; maximum]
Subcutaneous implant	0,1	0,1
Levonorgestrel IUD	0,2	0,2
Injectable progestogen	0,2	6
Oral contraception	0,3	9
Tubal sterilization	0,5	0,5
Coper IUD	0,6	0,8
Vaginal ring	0,6	1,0
Cutaneous patch	0,7	0,9
Male condom	2,0	18
Natural methods/ withdrawal	[0,4 ; 5]	[22 ; 24]
Other barrier methods	[5 ; 26]	[12 ; 32]

Table 1 - Contraceptive efficacy of the different contraception methods (per 100 oman-years of use) - Main source : Trussell 2011 [8]. Source for the patch and the ring: summary of the product characteristics of EvraR patch and NuvaringR ring.
French public medication data bank: [http://base-donnees-publique.medicaments.gouv.fr/].

Contraception method	Facial acne (CI 95 %)	Dysmenorrhea (CI 95 %)	Menorrhagias (% of reduction**)
Combined oral contraception		OR (0,3 ; 0,8)	From -35 % to -68 % at 1 year
1st generation			
2nd generation	Δ* (-16,5 ; -3,5)	ORC2G/C3G	
3rd generation	Δ* (-14,2 ; -4,5)	(0,2 ; 0,8)	
4th generation	Δ* (-55,0 ; -3,1)		
Microprogestative pills			from -87% at 3 months
Levonorgestrel IUD			from -77% to -94% at 3 months

Table 2 - Therapeutic efficacy of the different contraception methods * delta/triangle
"' : difference in mean efficacy between COC and placebo, evaluated by reduction in number of acne lesions after 6 menstrual cycles; C2G: combined 2nd-generation oral contraception; C3G: combined 3rd-generation oral contraception; OR : odds ratio of degree of relief from dysmenorrheas at each cycle, compared with placebo; * : The progestogen evaluated was levonorgestrel for 2nd-generation combinations, norgestimate for those of the 3rd generation, and drospirenone for those of the 4th generation. ;

Cancer prevention (Table 3)

A meta-analysis of 24 cohort and case-control studies showed that utilization of oral contraception (combined or progestogen-only) reduced the risk of ovarian cancer, with an OR between 0.7 and 0.8 for 185 women undergoing treatment aimed at avoiding cancer occurrence at five years (I^2 = 92%). The longer the utilization of oral contraception, the more pronounced its effect, with a reduction in ovarian cancer incidence higher than 50% following more than ten years of use[24]. No difference was found between the COC generations[25]. Even though no study has been carried out on the patch or the ring, their effects on ovarian cancer are probably similar to those obtained with oral contraceptives. In a low-power study, medroxyprogesterone acetate (MPA or DMPA) (Depo-

Contraception method	Ovarian cancer (CI 95%)	Endometrial cancer (CI 95%)	Colorectal cancer (CI 95%)
All oral contraceptives	OR (0,7;0,8)	OR (0,4;0,8)	OR (0,8 ;0,9)
Levonorgestrel IUD	OR (0,4;0,8)	OR (0,3;0,7)	OR (1,0;1,4)

Table 3: Preventive efficacy of the different contraception methods OR and RR: odds ratio and relative risk of cancer occurrence, in comparison with women not exposed to contraceptive

Contraception method	Weight gain (kg)	LDL ≥1.6 g/L at 3 years (CI 95%)[4]	Femoral neck BMD (% reduction at 3 years)
Combined oral contraception			-1,3 %[5]
2nd generation	Δ6 mois (-0,2 ; 0,8)[1]		
3rd generation	OR (0,5 ; 2,3)[2]	OR (1,6 ; 11,3)4	
Transdermal patch	OR (0,3 ; 3,0)[3]		
Injectable progestin	Δ36 mois = 3,11	OR (1,1 ; 8,0)4	-5,2 %[5]
Subcutaneous implant	Δ 6 mois (0,5 ; 0,9)[1]		

Table 4: Metabolic risks of the different contraception methods
BMD: bone mineral density; LDL: low-density lipoproteins
1. Mean difference in weight before and after treatment, in comparison with the placebo group or a group not using a hormonal method; 2. Odds ratio or risk of weight gain superior to 2.3 kg at 4 cycles, in comparison with the placebo group; 3. Odds ratio or risk of weight gain more than 5% of baseline weight at 9 months, in comparison with the placebo group; 4. Odds ratio or risk of LDL hypercholesterolemia at 3 years, in comparison with a group using non-hormonal methods; 5. Relative reduction of bone mineral density, taking into account a 0.6% increase in a control group using non-hormonal contraception.

Contraception method,	Absolute risk (/10,000/year),	Relative risk (CI 95%)
Combined oral contraception (COC)*;		(2,9 ; 4,3)
1st generation;		(2,0 ; 5,1)
2nd generation;	2	(2,0 ; 4,1)
3rd and 4th generations;	3-4	(2,7 ; 5,4)
Transdermal patch;	1-10	(3,5 ; 17,7)
Vaginal ring;		(4,7 ; 8,9)
Microprogestative pills;		(0,6 ; 1,5)
Subcutaneous implant;		(0,6 ; 3,4)
Injectable progestogen,		(1,3 ; 5,6)
Levonorgestrel IUD		(0,2 ; 1,5)

Table 5: Thromboembolic risks of the different contraception methods
Absolute and relative risks: Risks of occurrence of venous thrombosis in women using contraceptives, in comparison with women not exposed to contraceptives; *the progestogen evaluated was norethisterone for 1st-generation combinations, levonorgestrel for those of the 2nd generation, desogestrel or gestodene for those of the 3rd generation, and drospirenone for those of the 4th generation.

ProveraR), the only injectable progestin used in France, was shown to reduce the risk of ovarian cancer, with the OR ranging from 0.4 to 0.9[26]. The levonorgestrel IUD likewise diminished the risk, with the OR ranging from 0.4 to 0.8[27].

A meta-analysis of nine cohort and case-control studies underlined the protective effect of oral contraception, combined or progestogen-only, with regard to endometrial cancer, with an OR ranging from 0.4 to 0.8 for 132 women undergoing lifelong treatment (lack of heterogeneity, I^2 not indicated)[28]. The effect does not depend on duration of oral contraception use. The levonorgestrel IUD likewise reduces the risk of endometrial cancer, with the OR ranging from 0.3 to 0.7[27].

Metabolic risks (Table 4)

A Cochrane review evaluated the impact of combined contraceptives on weight evolution29. Out of 49 trials, the four tests against placebos or groups undergoing no intervention showed no impact of either the COCs (whatever the generation) or the transdermal patch. Moreover, abandonment of COCs due to weight variations did not differ from one group to the next. Another Cochrane review revealed a mean body mass increase of 11% with DMPA compared to a group not applying any hormonal method[30]. In one study, DMPA use led to a weight gain of 3.1 kg in 36 months compared with a control group[31]. In another study, a levonorgestrel implant used in Quebec (NorplantR) brought about an average weight gain of 0.7 kg at 6 months compared with a group applying a non-hormonal method or no contraception at all[30]. As regards the other contraception methods, there have been no published

Contraception method	Myocardial infarction (CI 95%)	Cerebrovascular accident (CI 95%)
Estrogen-progestin contraception,	OR (1,2 ; 2,3)	OR (1,2 ; 2,8)
Oral route		
20 µg	RR (1,0 ; 1,8)	RR (1,4 ; 1,9)
30-40 µg	RR (1,7 ; 2,1)	RR (1,6 ; 1,9)
50 µg	RR (2,8 ; 5,0)	RR (1,5 ; 2,7)
Transdermal patch		RR (0,8 ; 12,6)
Vaginal ring	RR (0,7 ; 6,5)	RR (1,4 ; 4,4)
Progestogen-only	OR (0,6 ; 1,8)	OR (0,7 ; 1,3)
Microprogestative pills	RR (0,6 ; 3,9)	RR (0,7 ; 2,6)
Levonorgestrel IUD	RR (0,7 ; 1,5)	RR (0,5 ; 1,0)

Tableau 6 - Risques artériels des différentes méthodes contraceptives DIU : dispositif intra-utérin ; OR et RR : odds ratio et risque relatif de survenue d'infarctus du myocarde et d'accident vasculaire cérébral, par comparaison aux femmes non exposées à un contraceptif.

studies, which means that no results are currently available.

Desogestrel-containing COC increased the risk of LDL hypercholesterolemia (greater than or equal to 1.6g/L), with the OR ranging from 1.6 to 11.3 at 3 years, and also occasioned a rise on HDL cholesterolemia. As for DMPA, it increased the risk of LDL hypercholesterolemia, with the OR ranging from 1.1 to 8.0 at 3 years; at the same time, it led to a reduction in HDL cholesterolemia[32]. According to one study, contraception methods had little effect on glycemia. For example, DMPA occasioned a rise in blood glucose level of 2mg/dL at 6 months and 3mg/dL at 30 months (vs. 1 mg/dL at 36 months with oral contraception or non-hormonal methods)[33]. In yet another study, after three years COC and DMPA brought about a reduction of bone mineral density (BMD) ranging from 1.3% to 5.2% at the femoral neck (vs. a 0.6% increase in a control group using non-hormonal contraception), and from 0.5 to 3.7% at the lumbar rachis (vs. a 1.9% increase in the control group)[34]. On the other hand, the effect of hormonal contraceptives on bone fracture risk was not clearly determined[35,36].

Venous thromboembolic risks (Table 5)

According to a meta-analysis of 15 observational studies, COC use increased the risk of venous thromboembolism (phlebitis or pulmonary embolism), with the odds ratio ranging from 2.9 to 4.3 (heterogeneity not indicated)[37], the degree of risk depending on the type of progestogen employed (levonorgestrel presents 30 to 60% less risk than the other progestogens). As for absolute risk of venous thrombosis per 10,000 women per year, 3 to 4 cases were reported in users of third or fourth-generation COC, 2 cases in users of second-generation COC, and 0.5 to 1 case in non-pregnant women not using the pill[38-40]. A meta-analysis demonstrated that degree of risk depended on ethynilestradiol (EE) dose, and was higher for COC containing 50 mg of EE than for COC containing 20 mg of EE[37]. As concerns the transdermal patch, absolute risk of thromboembolic accidents ranged from 1 to 10 cases per 10,000 women per year[41,42]. Finally, as regards progestogen-only pills, a meta-analysis of 8 observational studies showed that only their injectable forms increased the risk of venous thromboembolism (I^2 = 24%)[43].

Arterial risks (Table 6)

According to a meta-analysis, recent use of a combined estrogen-progestin contraception method (pill, transdermal patch or vaginal ring) increased the risk of arterial thrombosis, with the overall OR ranging from 1.2 to 2.3 for risk of myocardial infarction (MCI) and from 1.2 to 2.8 for risk of ischemic cerebrovascular accident (CVA) (heterogeneity not indicated)[44]. With COC, arterial risk essentially grew along with estrogen dose[45], and combined risk of MCI and CVA was associated with the use of second-generation COC (OR from 1.7 to 2.4), third-generation COC (OR from 1.6 to 2.1) and to an even greater extent with first-generation COC (OR from 2.1 to 4.1)[44]. Lastly, progestogen-only pills did not generate a risk of arterial thrombosis[44].

The risk of arterial thrombosis linked to estrogen-progestin contraception increased when associated with an additional cardiovascular risk factor, particularly arterial hypertension, smoking and migraine with aura[45]. On the other hand, when there was no association with an additional cardiovascular risk factor, estrogen-progestin contraception did not increase the risk of hemorrhagic stroke (CVA)[44].

Other risks (Table 7)

As regards cancer risks, oral contraception (combined or progestogen-only) and the

levonorgestrel IUD slightly increase breast cancer risk, with the odds ratio between 1.0 and 1.2 (one case out of 113 women using a contraception method) (I^2 = 71%) for oral contraception and between 1.1 and 1.3 for the levonorgestrel IUD, while risks of cervical cancer were not demonstrated[27,28]. As regards the other hormonal methods, no data on cancer risks were available. Risk of pelvic infection increased somewhat in the 3 months following IUD insertion in cases of a preexisting sexually -transmitted infection (STI), with a risk of 0 to 5 infections per 100 women vs. 0.2 in cases without preexisting STI[47,48]. The only method preventing STI risk was the condom[49].

Risk of ectopic or tubal pregnancy was invariably lower using a contraception method inasmuch as pregnancy occurrence probability was reduced. In the event of method failure, however, most contraception procedures were associated with ectopic pregnancy risk; this was particularly evident with IUDs (OR ranging from 13.4 to 33.1) and tubal ligation (OR ranging from 1.7 to 34.8). The risk also existed when emergency levonorgestrel-based contraception did not work (OR between 3.9 and 6.1)[50].

A recent large-scale cohort study found no association between oral contraception before or during pregnancy and fetal deformities[51].

In a review of clinical trials, menstrual disorders were associated with use of subdermal implants; 9% of women had more frequent bleeding, and 28% of them went through prolonged bleeding during the first trimester. While these disorders decreased in frequency as time elapsed, they led to implant withdrawal in 21% of the women undergoing treatment[52].

According to data reported in a trial, ulipristal was associated with headaches, dysmenorrhea, and nausea during the weeks following intake[17].

DISCUSSION

Contraception methods are highly numerous; each of them presents advantages and drawbacks likely to condition women's choices. Contraceptive efficacy, non-contraceptive benefits and risks combine to determine therapeutic indications, contraindications and precautions for use. The efficacy of some contraception methods varies according to practical means of utilization, which depend upon method-related constraints, user profiles and/or a number of hazards (forgetfulness, ruptures...). Such variabilities are expressed by substantial differential efficacy between the theoretical and the practical Pearl indexes, particularly as regards oral contraception (combined or progestogen-only), injectable progestin, barrier methods and so-called natural methods. Some methods procure non-contraceptive benefits, especially COC (improved facial acne and dysmenorrheas, prevention of some types of cancer), hormonal IUDs (reduced metorrhagias) and the condom (STI prevention).

Risks vary in nature, frequency and severity from one contraception method to the next. The venous thromboembolic risks of estrogen-progestin and injectable progestin contraception and the arterial risks of estrogen-progestin contraception are relatively rare but potentially serious. And some forms of oral contraception, particularly third-generation COCs and injectable progestogen, entail metabolic risks. A slight risk of breast cancer is to be expected with COCs and hormonal IUDs. Moreover, several methods are associated with a heightened risk of ectopic pregnancy (in the event of pregnancy), risk that is nonetheless lowered when failure does not occur, and IUD insertion is associated with a risk of pelvic infection in the event of preexisting STI.

Strengths and limitations of the study

In this review, evaluation of contraceptive efficacy was based on data from the American reference study[9]. These data differ from those of two less recent French studies, in which some theoretical and practical Pearl indexes had not been evaluated[53,54]. Moreover, few data are available to establish a comparison between the non-contraceptive advantages and drawbacks of the different categories of hormonal methods.

As for observational pharmaco-epidemiological studies, they are exposed to confounding factors, most notably confounding by indication[55]. These biases may be connected with the fact that choices of contraception methods are influenced if not dictated by women's socio -economic environment; for example, in the early 2000s women from privileged backgrounds were more inclined than others to avail themselves of third-generation pills[56].

Some risks seem only slightly associated with contraception, for example breast cancer with oral contraception (odds ratio from 1.0 to 1.2). While these peripheral associations are indeed indicative of limited individual risk, when applied to a large proportion of the female population they cannot from a public health standpoint be discounted. In this respect, it is advisable with a given patient to take into account the overall

medico-social risk-benefit balance, as well as the constraints connected with the method under consideration.

Article selection and data extraction by a single author (in the absence of situations of uncertainty) constitutes another limit to this study, as does the lack of systematic evaluation of the methodological quality of the meta-analyses and studies included. The heterogeneity of the studies included in the meta-analyses cited was reported when the I^2 indicator was available.

Choosing a contraception method: The steps to be taken

Choice of a contraception method must necessarily take into account the patient's biomedical profile and thereby identify possible contraindications or precautions for use. An initial consultation will include a clinical evaluation of the patient's past history and risk factors (cardiovascular, metabolic and gyneco-obstetric) and susceptibility to drug interactions. Indeed, some enzyme inducers, particularly anti-epileptic drugs (lamotrigine, carbamazepine), antiretroviral drugs, antituberculosis drugs (rifampicin, rifabutin) and hypericum, may diminish the efficacy of a hormonal method of contraception40. And prior to IUD insertion, it is highly recommended to verify the absence of pregnancy (including ectopic pregnancy) and pelvic infection, even following emergency contraception. A paraclinical evaluation can also be prescribed during this consultation to identify risk factors and contraindications. When a hormonal method is envisioned, the evaluation will include assay of total cholesterol, triglycerides and fasting blood glucose[39] and proposed testing for HIV infection[57]. This initial biological evaluation can be carried out 3 to 6 months following prescription, and then be renewed every 5 years in the absence of any anomaly[39]. On the other hand, in the event of hemostasis anomalies or venous thromboembolic family history, hemostasis evaluation may be useful when estrogen-progestin contraception is envisioned[39]. That much said, negative results of thrombophilia screening tests do not necessarily preclude all thrombogenic mutations. However, in patients without any risk factor for venous thrombosis, hemostasis evaluation presents a poor cost-benefit ratio and is not recommended[58]. When a STI risk factor is present, prior to IUD insertion vaginal swab in search of chlamydia and gonococcal infections is advisable[39].

Choice of a contraception method should be closely tailored to the needs and preferences of the patient and/or couple. It is important to ensure favorable conditions for interviews and to remain attentive to the preoccupations of the patient and/or couple. Developed by the WHO, the BERCER model contributes to shared decision-making with the patient. It consists in 6 steps: welcome, meeting, information, choice, explanation and return[39]. Prescription of a contraception method must also take into account the patient's life style and beliefs, as well as the objectives of her impending contraception. According to her personal and reproductive life style (sexual activity, relationship in a couple, presence of children, expected contraception, the patient can search for partial or total, transitory or permanent protection against risk of pregnancy, associated or not with STI prevention and other expected benefits.

The physician must know how to inform the patient about the different available contraception methods, including the IUD for nulliparous women, contraceptive sterilization for more aged ones, and the barrier or natural methods, as well. Since 2001, French law has recognized the right to sterilization in majors for contraceptive purposes, provided that a 4-month "reflection period" following the initial consultation is respected. As for relevant information, it pertains to the efficacy, the potential benefits and risks, as well as the constraints associated with the different contraception procedures. Patients can also be referred to sites or scientifically validated documents (in France, those emanating from *Santé publique France* and the *HAS*)[59,60].

Confrontation of the biomedical criteria evaluated by the physician and the expectations and preferences of the patient and/or couple should lead to a shared, joint decision favoring the satisfaction and adherence of the patient and/or couple. Indeed, one expectation of patients is that their contraception not have a deleterious effect on their well-being, their intimacy, or their relationship in a couple[39,61]. Follow-up consultations can serve to assess degree of adhesion, correct use, tolerance, and patient satisfaction; if possible, the partner's comments will be welcome. In the event of dissatisfaction, the initial choice will require renewed discussion and an alternative method may be envisioned. Reasons for changing methods are multitudinous: relational problems or difficulties connected with sexual activity, appearance of a medical contraindication[62].

CONCLUSION

Given the wide-ranging variety of contraception methods, it matters to tailor the choice of procedure to the biomedical profile (expected benefits, potential risks and specific constraints) and to the preferences of the patient in the framework of a shared decision favoring that person's adherence and satisfaction.

Summary

Objective. To describe the contraceptive (prevention of unintended pregnancies) and non-contraceptive (therapeutic or preventive) benefits, and the risks of contraceptive methods.

Methods. Literature review from the Medline databank and the Cochrane library. A total of 687 articles were initially identified and 377 finally included. The contraceptive effectiveness has been measured with the Pearl index, the non-contraceptive benefits and the risks with absolute or relative (RR) risks, odds ratio (OR), mean effectiveness difference or excess risk.

Results. The practical Pearl index is minimal for the implant, IUDs, transdermal patch and tubal ligation (between 0 and 1 for 100 womenyears), and maximal for the barrier methods (up to 32). Combined oral contraception (COC) improves acne (loss of 3 to 55 facial lesions) and primary dysmenorrhea (OR between 0.3 and 0.8). The levonorgestrel IUD reduces menorrhagia from 77 to 94 %, and a COC reduces it by 35 to 68 %. Progestin-only contraceptives prevent endometrial and ovarian cancers (OR or RR between 0.3 and 0.9). Only the injectable progestins induce a weight gain (of 3.1 kg on average at 36 months). The risk of venous thrombosis is associated with the use of combined contraceptives (RR between 2,0 and 17,7, depending on the various generations) or of an injectable progestin (RR between 1.3 and 5.6). The use of combined contraception is associated with a risk of arterial thrombosis (OR between 1.2 and 2.8).

Conclusion. The choice of a contraceptive method must take into account the benefit-risk balance, as well as the history and preferences of each patient.

➜ **Key words**: female contraceptive agents; health benefits; risks.

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