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REVIEW

Treatment of Acne Vulgaris During Pregnancy and Lactation: A Narrative Review

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ABSTRACT

Acne vulgaris frequently affects women during pregnancy and lactation. Hormonal and physiologic changes in pregnancy contribute to the pathogenesis of acne during the various phases of pregnancy. Several effective acne treatments commonly prescribed in the general population are contraindicated during pregnancy or lactation. There is a lack of guidelines and updated resources on acne management in these populations. In this narrative review, we summarize existing evidence on the safety and efficacy of acne treatments during pregnancy and breastfeeding. Acne management in pregnancy and lactation should follow a stepwise approach based on severity to minimize risk. Topical therapies, such as benzoyl peroxide, azelaic acid, or keratolytics, can be used to treat mild-to-moderate disease. Moderate-to-severe acne may require systemic treatments, including penicillin, amoxicillin, cephalexin, and erythromycin, with special consideration for trimester-specific teratogenicity of medications and relevant medical history of the mother and infant. For refractory cases, oral or intralesional corticosteroids as well as laser and light therapies may be considered. This review provides an updated reference to aid patient-physician decision-making on acne management in these special populations.

Keywords: Acne vulgaris; Lactation; Management; Pregnancy; Teratogen

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Key Points
The treatment of acne in pregnant and lactating patients presents a challenge to dermatologists due to concerns for maternal and fetal safety
There is a lack of clinical studies on the safety and efficacy of common acne treatments in pregnancy and lactation
Acne management in these populations should begin with a stepwise approach, with considerations for acne severity and trimester-specific fetal risk
Management of mild-to-moderate acne should start with topical therapies, including benzoyl peroxide, azelaic acid, or other keratolytic agents
Refractory acne may require systemic or procedural treatments with careful consideration of fetal risk

INTRODUCTION

Acne vulgaris is a chronic dermatologic condition that affects people during pregnancy and lactation. While epidemiologic data are limited, cross-sectional and survey studies have demonstrated that up to 43% of people experience acne during pregnancy [1–3].

While the pathogenesis is complex and not well studied, several hormonal and physiologic changes during various stages of pregnancy contribute to acne development [4]. Acne in pregnancy is typically inflammatory, extends to the trunk, and is most severe during the second and third trimesters. Potential risk factors associated with severe acne in pregnancy include young age (age $\leq$ 25 years), primigravida, previous irregular menstruation, polycystic ovary syndrome, high maternal and low fetal weight, and fetal female sex; however, these associations are not well established [3–5].

Data on the safety and efficacy of most acne medications during pregnancy and lactation are lacking. This is primarily due to exclusion of pregnant and lactating patients in clinical trials given inherent ethical issues with these special populations [6, 7]. Recent observational and case studies have expanded the existing knowledge of safe acne management during pregnancy and lactation [6]. In this narrative review, we provide an updated summary of available data and recommendations on acne treatments during pregnancy and lactation. The findings presented in this article are based on previously conducted studies; no new studies with human participants or animals were performed by the authors for this article.

ACNE MANAGEMENT DURING PRECONCEPTION AND PREGNANCY PLANNING

Careful selection of acne treatments during the pregnancy planning stage is important to reduce future maternal and fetal risks. While the definition varies, the "preconception period" in this review refers to when a patient first decides to attempt pregnancy [7].

Acne therapies that are absolutely contraindicated during the preconception stage are summarized in Table 1. For example, isotretinoin and spironolactone require a washout period of at least 1 month before pregnancy planning [6]. Additional acne medications that should be avoided, but are not absolutely contraindicated, in the first trimester are also listed in Table 1.

ACNE MANAGEMENT DURING PREGNANCY

There are several systems that rate the teratogenicity of medications, including those developed by the Food and Drug Administration (FDA), Briggs Drugs in Pregnancy and Lactation, and other international health agencies [8, 9]. Historically, there were often discrepancies in safety classifications between systems, with risk categories commonly viewed as confusing or

Table 1 Acne treatments to avoid during pregnancy planning and preconception

	Drug	Washout period	Pregnancy safety rating		Notes
			FDA	Briggs	
Contraindicated	Isotretinoin	Discontinue 1 month before conception	X	Contraindicated	Contraindicated
	Spironolactone	Discontinue 1 month before conception	C	Data suggest risk	Contraindicated
	Tazarotene	None	X	Contraindicated	Contraindicated
	Trimethoprim/sulfamethoxazole	None	B-C	Data suggest risk	Contraindicated
Not recommended	Other topical retinoids (e.g., adapalene, tretinoin, trifarotene)	None	C	Data suggest risk	Not recommended, but likely low risk
	Amoxicillin	None	B	Compatible	Not recommended during 1st trimester
	Oral erythromycins (base and ethylsuccinate)	None	B	Compatible (estolate contraindicated)	Not recommended during 1st trimester
	Oral metronidazole	None	B	Low risk	Not recommended during 1st trimester
	Oral corticosteroids	None	C	Data suggest risk	Not recommended during 1st trimester

FDA Food and Drug Administration

overly simplistic [10]. In response in 2015, the FDA replaced their long-standing letter labeling schema (Table 2) with the Pregnancy and Lactation Labeling Rule (PLLR) to provide more detailed safety data specific to pregnant and lactating patients in clinical trials [8].

Recommendations for acne therapies during pregnancy based on acne severity and trimester are summarized in Table 3. Acne management in pregnancy should consist of a step-wise approach to minimize risk, starting with topical treatments for mild-to-moderate acne, adding systemic therapies (including antibiotics) for moderate-to-severe acne, and reserving oral corticosteroids or procedural treatments for fulminant or refractory cases [11].

ACNE MANAGEMENT DURING LACTATION

Safety assessments of acne treatments in lactating patients are summarized in Table 4. These safety assessments are gathered from the FDA, Briggs, the American Academy of Pediatrics (AAP), and Hale's Medications & Mothers' Milk (Table 2). Additionally, the National Library of Medicine's Drug and Lactation Database

Table 2 FDA and Hale medication safety rating systems

Category (FDA, Hale)	Pregnancy: previous FDA pregnancy risk	Lactation: Hale lactation risk
A, L1 Compatible	Adequate well-controlled studies failed to demonstrate risk in the 1st trimester	Adequate well-controlled studies failed to demonstrate risk
B, L2 Probably Compatible but Potential Risk	Animal studies failed to demonstrate risk; no adequate studies in humans	Limited studies show no increase in adverse effects
C, L3 Probably Compatible but Potential Risk	Animal studies showed an adverse effect; no adequate studies in humans; potential benefit may warrant use	Lack of or limited studies show minimal non-threatening adverse effects; potential benefit may warrant use
D, L4 Likely Hazardous	Evidence of human fetal risk; potential benefit may warrant use	Evidence of risk to infant; potential benefit may warrant use
X, L5 Contraindicated	Human or animal studies demonstrated fetal abnormalities; risks outweigh any potential benefit	Human studies demonstrated risk to infants; risks outweigh potential benefit

FDA Food and Drug Administration

(LactMed) provides peer-reviewed summaries of published drug safety data during lactation [12–14].

Overall, there are sparse and sometimes contradictory data on the safety and efficacy of acne medications in these patients. For example, not all medications deemed safe in pregnancy can be continued into the lactation period. Similarly, some acne therapies contraindicated during pregnancy, such as topical retinoids, become acceptable to use while lactating [15]. While no acne treatments are strictly contraindicated during lactation, isotretinoin and topical dapsone should be avoided because of unclear risks to breastfed infants [15].

OVERVIEW OF ACNE MEDICATIONS IN PREGNANCY AND LACTATION

Topical Treatments

Topical Antimicrobials

Azelaic Acid Azelaic acid is a common topical acne treatment that is minimally (4–8%) absorbed through the skin and is found naturally in milk, wheat, rye, and barley [16, 17]. It has antioxidant, anti-inflammatory, and comedolytic properties [18]. Monotherapy or combination therapy is used for mild non-inflammatory and inflammatory acne, as well as for treating post-inflammatory hyperpigmentation [18–20]. While there are limited studies of azelaic acid use among pregnant and lactating patients, no adverse fetal effects have been reported, and it is considered safe during all trimesters [6, 11, 15, 17, 21–23]. Twice daily usage and a maximum strength of 20% are acceptable during pregnancy and lactation [6, 11, 24].

Benzoyl Peroxide Topical benzoyl peroxide is a common over-the-counter acne therapy with antimicrobial and keratolytic effects [25]. It is useful as monotherapy for mild non-inflammatory and inflammatory acne or in combination with antibiotics to prevent antibiotic resistance [26–28].

Twice daily application of a maximum strength of 5% benzoyl peroxide is widely

Table 3 Acne treatments during pregnancy

Acne severity	Drug	Pregnancy safety rating		Trimester-specific safety		
		FDA	Briggs	1st	2nd	3rd
Mild-to-moderate	Azelaic acid	B	–	✔	✔	✔
	Benzoyl peroxide	C	–	✔	✔	✔
	Salicylic or glycolic acids	–	–	✔	✔	✔
	Topical clindamycin + BPO	B	Compatible	✔	✔	✔
	Topical sodium sulfacetamide ± sulfur	C	–	✔	✔	✔
	Topical metronidazole + BPO	B	–	✔	✔	✔
	Topical Dapsone + BPO	C	Compatible	✔	✔	X
Moderate-to-severe	Oral amoxicillin	B	Compatible	X	✔	✔
	Oral cephalexin	B	Compatible	✔	✔	✔
	Oral erythromycins (base and ethylsuccinate)	B	Compatible (except estolate)	X	✔	✔
	Oral azithromycin	B	Compatible	✔	✔	✔
	Oral clindamycin	B	Compatible	✔	✔	✔
Limited data: consider for fulminant or refractory	Intralesional corticosteroids	C	Data suggest risk	✔	✔	✔
	Oral corticosteroids	C	Data suggest risk	X	✔	✔
	Oral metronidazole	B	Low risk	X	✔	✔
	Oral tetracyclines	D	Contraindicated in 2nd and 3rd trimesters	✔	X	X
	Light and laser therapies	–	–	✔	✔	✔
Contraindicated	Isotretinoin	X	Contraindicated	X	X	X
	Spironolactone	C	Data suggest risk	X	X	X
	Trimethoprim-sulfamethoxazole	B-C	Data suggest risk	X	X	X
	Tazarotene	X	Contraindicated	X	X	X
	Other topical retinoids (e.g., adapalene, tretinoin, trifarotene)	C	Contraindicated	X	X	X
	Clascoterone	–	–	No data available		

FDA Food and Drug Administration, *BPO* benzoyl peroxide, – no rating available

Table 4 Acne treatments during lactation

Acne severity	Drug	Lactation safety rating		
		Hale	AAP	LactMed
Mild -to-moderate	Benzoyl peroxide	L2	–	Low risk
	Azelaic acid	L3	–	Low risk
	Salicylic or glycolic acids	L3	–	Acceptable
	Topical clindamycin + BPO	L2	Compatible	Unlikely to be of concern
	Topical sodium sulfacetamide ± sulfur	L2	–	–
	Topical retinoids	L3	–	Low risk (limit tazarotene to < 20% BSA)
	Topical metronidazole + BPO	L3	Of concern	Unlikely to be of concern
Moderate-to-severe	Oral amoxicillin	L1	Compatible	Acceptable
	Spironolactone	L2	Compatible	Acceptable
	Oral cephalexin	L2	Compatible	Acceptable
	Oral azithromycin	L2	–	Unlikely to be of concern
	Oral clindamycin	L2	Compatible	Low risk (alternate drug preferred)
	Oral erythromycins	L3	Compatible	Acceptable (few cases of pyloric stenosis with use in first 2 weeks of breastfeeding)
	Trimethoprim/sulfamethoxazole	L2/L3	Compatible	Acceptable (avoid in hyperbilirubinemia, G6PD deficiency, and prematurity)
Limited data: consider for fulminant or refractory	Intralesional corticosteroids	L3	–	–
	Oral corticosteroids	L2	Compatible	Acceptable (short-term use only; Wait 4 h after intake before breastfeeding)
	Oral metronidazole	L2	Of concern	Varying concern (discontinue breastfeeding for 12–24 h after single-dose therapy)
	Oral tetracyclines	L3–L4	Compatible	Acceptable (short-term use only)
	Clascoterone	–	–	–
	light and laser therapies	–	–	–
	Isotretinoin	L5	–	No recommendation (alternate drug preferred)
	Topical dapsone	L4	Compatible	Likely of concern (alternate drug preferred)

AAP American Academy of Pediatrics, *BPO* benzoyl peroxide, *BSA* body surface area, *G6PD* glucose-6-phosphate dehydrogenase, – no rating available

considered an acceptable acne treatment during all phases of pregnancy [6, 11, 15, 17, 21–23]. There are no reported teratogenic effects. Despite limited research, benzoyl peroxide is considered low risk because of minimal systemic absorption and rapid renal excretion [15, 17]. For most people exposure to benzoic acid, the metabolized form of benzoyl peroxide, is greater from the diet than from topical therapy [29].

Azelaic acid and benzoyl peroxide have comparable efficacies [30]. Azelaic acid may be preferred in patients who cannot tolerate benzoyl peroxide or are experiencing post-inflammatory hyperpigmentation, particularly skin of color patients [19, 20, 24]. It is also safe to

combine azelaic acid and benzoyl peroxide during pregnancy [11].

Sodium Sulfacetamide Sodium sulfacetamide is a topical antimicrobial agent used for the treatment of acne. It is bacteriostatic, acting through inhibition of bacterial folic acid synthesis [31, 32].

While there are limited data on sodium sulfacetamide safety, no fetal anomalies have been reported, and it is likely safe during all phases of pregnancy [6, 21, 35–37]. Given minimal systemic absorption, there is low concern for appreciable folic acid reduction in pregnant patients [6, 17, 33]. Sodium sulfacetamide use is generally considered safe during lactation except when breastfeeding infants with glucose-6-phosphate dehydrogenase (G6PD) deficiency or hyperbilirubinemia given the risk of infantile jaundice and kernicterus [34].

Topical sodium sulfacetamide is commonly combined with sulfur for added antimicrobial and keratolytic effects against acne. Although formal studies in these populations are lacking, sulfur is considered safe among pregnant and lactating patients [33, 35].

Topical Antibiotics

Topical antibiotics are effective against inflammatory acne by reducing *C. acnes* on the skin. To reduce the risk of antibiotic resistance, all topical antibiotics should be combined with another antimicrobial agent, such as benzoyl peroxide [36].

Topical Clindamycin Topical clindamycin is the most prescribed topical antibiotic for acne. Although studies are limited, topical clindamycin is known to cause negligible systemic absorption and is considered safe during all trimesters of pregnancy and lactation [6, 11, 15, 17, 21, 22, 37]. In general, oral drugs deemed safe during pregnancy and lactation, including clindamycin, are also safe in topical forms [6].

Topical clindamycin has been associated with pseudomembranous colitis and should be used with caution in patients with history of gastrointestinal disease [38, 39]. Application should be avoided in the chest area of lactating patients because of a potential increased risk of diarrhea in breastfed infants [40].

Topical Erythromycin Topical erythromycin, another commonly used antibiotic for acne treatment, is minimally absorbed and has been shown through limited studies to be safe for use during all trimesters of pregnancy and lactation [6, 11, 15, 17, 21, 22, 37]. Like clindamycin, application should be avoided in the breast area of lactating patients [40].

Notably, topical erythromycin use and efficacy have decreased because of high rates of antibiotic resistance in the community, and other topical antibiotics may be preferred [41–43].

Topical Metronidazole Metronidazole is a second-line topical antibiotic for acne. Although studies are limited, topical metronidazole is considered safe during all trimesters and lactation. Systemic absorption is negligible, and no adverse fetal effects have been reported with topical metronidazole use [6, 11, 17, 21, 22].

Topical Dapsone Dapsone is another second-line topical antibiotic used for acne. Topical dapsone is safe during the first and second trimesters of pregnancy but should be discontinued before the last month of pregnancy to minimize the theoretical risk of neonatal hyperbilirubinemia [6, 11, 17, 21, 22, 33]. No teratogenic effects have been reported with topical or oral dapsone [22]. Topical dapsone can transfer to breastmilk and is not recommended for acne treatment during lactation [44, 45].

Topical Alpha- and Beta Hydroxy Acids

Salicylic Acid and Glycolic Acid Topical beta hydroxy (e.g., salicylic) acids and alpha hydroxy (e.g., glycolic) acids are effective anti-acne agents available in several over-the-counter products. Although they lack FDA pregnancy safety ratings, they are considered safe during all trimesters of pregnancy and breastfeeding because of their negligible systemic absorption [6, 11, 15, 17, 21–23]. One caveat is that pregnant patients should avoid applying topical

salicylic acid over large areas for prolonged periods or under occlusive dressings to prevent increased systemic absorption [17, 46]. Glycolic and lactic acid peels are considered safe during pregnancy and lactation because of limited dermal penetration [47].

Topical Retinoids

Topical retinoids are first-line acne treatments in the general population due to their effective comedolytic and anti-inflammatory properties [48]. Commonly used topical retinoids include tretinoin, adapalene, and tazarotene. According to the European Evidence-based (S3) Guidelines for acne management, adapalene is the preferred topical retinoid due to its superior tolerability and safety profiles [49]. Retinoids are derived from vitamin A, which is essential for embryonic development. However, excess vitamin A is associated with fetal malformations, including those affecting the heart, limbs, brain, and craniofacial structures [50].

Despite this potential, there are conflicting data on the safety of topical retinoids in pregnant patients. Although most safety ratings stem from systemic isotretinoin, which is known to be highly teratogenic and strictly contraindicated during pregnancy, topical retinoids are minimally absorbed, and some studies suggest application to limited areas is unlikely to increase fetal risk. While early case reports described fetal malformations associated with topical retinoid use [51, 52], multiple retrospective and prospective studies did not find an increased risk of major fetal malformations for topical tretinoin or adapalene during any trimester of pregnancy [53, 54].

Most studies on topical retinoid usage in pregnancy include only tretinoin and adapalene; there are sparse data on tazarotene and trifarotene safety during human pregnancy. Tazarotene is specifically contraindicated during pregnancy (FDA Category X) because of retinoid-like malformations from high doses in animal studies, but there are several cases of healthy infants who were inadvertently exposed to tazarotene before birth [17, 55]. Clinical trials for trifarotene, the newest FDA-approved topical retinoid, did not identify any maternal or fetal risks among pregnant participants [56]. Nevertheless, most experts recommend avoiding all topical retinoids during pregnancy because of these potential concerns [6, 17, 22].

Topical retinoids are considered safe during lactation. Although studies during lactation are limited, topical retinoids are likely low risk because only trace amounts are excreted into breast milk [15, 33]. Application of topical retinoids should be avoided on the breasts and other areas that make direct contact with the infant's skin [57]. Tazarotene is metabolized into a less lipophilic form than other retinoids, further reducing its risk of transfer to breast milk [15].

Topical Anti-androgens

Clascoterone Clascoterone cream 1% is the first topical hormonal acne treatment approved by the FDA [58–60]. Topical application minimizes the systemic adverse effects of oral hormonal treatments, such as spironolactone and oral contraceptives [59].

There are currently no data on the safety of clascoterone during human pregnancy and lactation. Some sources advise avoiding clascoterone, while others suggest clascoterone is likely safe because of minimal systemic absorption and rapid metabolism to cortexolone [61, 62]. Due to uncertainty of risks associated with clascoterone, alternative treatments should be considered for acne during pregnancy and lactation.

Systemic Treatments

Oral Antibiotics

Oral antibiotics can be useful for moderate-to-severe acne with inadequate response to topical therapies [63]. For treating acne in pregnancy, the order of preference of recommended oral antibiotics is: penicillins/aminopenicillins followed by cephalosporins and macrolides [22, 64].

To prevent antibiotic resistance, oral antibiotics should not be used as monotherapy and should be combined with benzoyl peroxide or azelaic acid [65, 66].

Beta-Lactams Although they are not common treatments among the general population, beta-lactams, including penicillin, amoxicillin, and cephalexin, are first-line oral antibiotics for the treatment of acne during pregnancy given their favorable safety profiles [6, 64]. Penicillin and cephalexin are safe during all trimesters of pregnancy. Amoxicillin usage in the first trimester has been associated with risk of cleft lip and palate, although findings are inconsistent [67, 68]. Thus, amoxicillin use should be restricted to the second and third trimesters only.

Beta-lactams are also safe treatments for acne during lactation. Less than 1% of the concentration of penicillins and cephalosporins is transferred to breastmilk [15].

Erythromycin Oral erythromycins, specifically erythromycin base and ethylsuccinate, are safe acne therapies during pregnancy during the second and third trimesters [6, 17]. Usage during the first trimester has been associated with increased risks of fetal cardiovascular malformations and pyloric stenosis, but recent studies found no significant relationships [69, 70]. The estolate form is contraindicated during all trimesters because of risk of maternal hepatotoxicity [71].

Oral erythromycin is minimally transferred to breastmilk and is considered safe during lactation [13, 15, 17, 72]. Some studies recommended avoiding oral erythromycin during the first 2 weeks of lactation because of some reports of infantile pyloric stenosis; however, this finding was not replicated in multiple subsequent studies [72–77].

Azithromycin Azithromycin is an alternative macrolide for patients who are unresponsive to or cannot tolerate erythromycin [6, 7]. Fewer data exist on azithromycin usage for acne, but current evidence supports its safety and effectiveness during all trimesters of pregnancy and lactation [78]. Compared to erythromycin, advantages of azithromycin include administration as a daily dose due to longer half-life and lower association to gastrointestinal upset [6].

Clindamycin Oral clindamycin is a third-line oral antibiotic for acne treatment during pregnancy [6]. Although existing evidence is limited, clindamycin is considered safe during all phases of pregnancy [9, 79]. Approximately 50% of maternal serum levels of clindamycin crosses the placenta, but no teratogenic effects have been reported. While clindamycin is associated with risk of pseudomembranous colitis in the general population, the risk does not increase during pregnancy [79, 80].

Oral clindamycin is also considered safe during lactation as it minimally transfers to breast milk and is considered low risk to breastfed infants [9, 33]. There is one report of bloody stools in a breastfed infant whose mother was receiving intravenous clindamycin; however, this relationship has not been proven [81].

Metronidazole Oral metronidazole, while rarely used for acne management, has been shown to be safe for pregnant patients in several studies and is a common treatment for pregnancy-associated infections [9]. It may serve as a potential alternative for severe, refractory acne during pregnancy [64].

Oral metronidazole is safe to use during lactation. Metronidazole is generally well tolerated, but a few cases of diarrhea, *Candida* infections, and lactose intolerance in breastfed infants have been reported in mothers taking metronidazole [82].

Oral Tetracyclines Tetracyclines are the most prescribed class of oral antibiotics for the treatment of acne. Doxycycline and minocycline are the most commonly used in the US, while doxycycline and lymecycline are the preferred tetracyclines in Europe [83]. Sarecycline is a newer narrow-spectrum tetracycline that is FDA approved to treat acne [60]. While tetracyclines are effective in the management of acne, they should generally be avoided during pregnancy. Although first trimester usage may be considered if necessary as it is not associated with increased risk of congenital malformations [84], after the 15th week of gestation, there is risk of permanent fetal teeth discoloration and bone growth inhibition [6, 17]. In addition, third

trimester use is associated with maternal liver toxicity [85]. Tetracyclines may also be associated with infantile inguinal hernia, hypospadias, and limb hypoplasia [9].

No increased risk of adverse effects in breastfed infants has been associated with tetracyclines [86, 87]. Tetracyclines are minimally transferred through breastmilk, and their absorption is further limited by calcium binding in breastmilk [87, 88]. However, two cases of black galactorrhea related to tetracyclines have been reported [89, 90].

Oral Trimethoprim/Sulfonamides Trimethoprim-sulfamethoxazole is an effective acne treatment but is contraindicated during pregnancy. First trimester use is associated with neural tube defects due to antifolate effects [11]. In addition, trimethoprim-sulfamethoxazole is associated with increased risk of miscarriage, preterm birth, low birth weight, cardiovascular defects with first-trimester exposure, and neonatal hyperbilirubinemia with third-trimester use [17].

Due to minimal transfer to breastmilk, trimethoprim and sulfonamides are acceptable to use while breastfeeding healthy, full-term infants. Sulfonamides exacerbate hyperbilirubinemia by displacing bilirubin from albumin and should be avoided in breastfed infants who are premature, G6PD deficient, or hyperbilirubinemia [6, 15, 17].

Other Oral Treatments

Oral Corticosteroids Low-dose prednisone has shown efficacy in treating severe, refractory inflammatory acne though should be used conservatively. A short course of low-dose prednisone may be considered for pregnant patients with fulminant or treatment-resistant acne. While there are no adequate studies of prednisone in pregnancy, oral prednisone limited to < 20 mg/day for a maximum duration of 1 month is thought to be safe during pregnancy [11]. Higher doses of prednisone may increase risk of premature labor, intrauterine growth restriction, gestational diabetes, and eclampsia [91]. Use of prednisone should be restricted to the second and third trimester; first trimester use is contraindicated because of risk of orofacial clefts [92].

Prednisone is considered safe during lactation; low levels pass into breastmilk, and no adverse effects have been reported. To minimize exposure, mothers are advised to wait 4 h after taking oral prednisone before breastfeeding [15].

Spironolactone Spironolactone can be effective for acne because of its antiandrogen properties [60, 93]. However, it is not recommended during pregnancy given animal studies demonstrating the risk of feminization and hypospadias of male fetuses [17, 22]. In humans, no cases of feminization have been reported among males with in utero exposure to spironolactone at doses up to 400 mg per day [94]. Due to insufficient data on its safety, a washout period of at least 1 month is recommended before conception [6].

Spironolactone is considered acceptable during breastfeeding [15]. Limited studies have shown minimal transfer to breastmilk and no associated adverse effects or electrolyte changes in breastfed infants [95–97]. Spironolactone may be associated with possible lactation suppression [98].

Isotretinoin Isotretinoin is contraindicated during pregnancy because of its teratogenic effects [6, 22], and all patients taking isotretinoin must be enrolled in the iPLEDGE pregnancy prevention program [17].

Women should wait at least 1 month after discontinuing isotretinoin before attempting to conceive. There is no evidence of increased risk of teratogenicity if conception occurs at least one menstrual cycle after stopping isotretinoin [6].

Isotretinoin use is not recommended during lactation. Isotretinoin is excreted into breastmilk because of its high lipid solubility [16]. Although no associated adverse effects of isotretinoin have been described in breastfed infants, given its known teratogenic risk, it is likely prudent to avoid during lactation [15].

Procedural Treatments

Intralesional Corticosteroids

Intralesional triamcinolone acetonide is an effective treatment for acne cysts and inflammatory nodules. There are limited and conflicting recommendations on its use during pregnancy. Although first trimester systemic corticosteroid use is associated with increased risk of cleft lip and palate [99], small amounts of intralesional corticosteroids cause minimal systemic absorption and are unlikely to increase fetal risk [11].

Due to its minimal absorption, intralesional corticosteroids for acne are also considered safe during breastfeeding [11].

Light and Laser Therapies

Light and laser therapies are useful treatment options for refractory acne. Narrowband-ultraviolet B phototherapy (NBUVB), photodynamic therapy (PDT), Nd:YAG laser, and pulse-dye laser treatments are generally considered safe during pregnancy [6]. While data are limited in pregnant patients, light and laser therapies have no known teratogenic effects.

Successful and safe use of NBUVB phototherapy to treat acne during pregnancy has been described in a case report [100]. Additional studies have demonstrated reduction of folic acid with high cumulative NBUVB doses, raising concern for risk of neural tube defects [100–102]. In pregnant patients and patients attempting pregnancy undergoing NBUVB phototherapy, dermatologists should periodically check folate levels or consult with patients' obstetricians to determine appropriate folic acid supplementation with NBUVB treatments [102].

Aminolevulinic acid (ALA), a topical photosensitizer commonly used with PDT, is classified as FDA category C and not considered safe during pregnancy [6]. One case of ALA-PDT use in pregnancy reported no adverse effects, but its safety remains unclear and PDT should be used without ALA during pregnancy [103].

In 2022, a 1726-nm laser system became the first energy device with FDA clearance for the treatment of acne [104]. While more evidence is needed about safety in pregnancy, this device may be an option for pregnant patients.

Although there are no studies of laser and light therapies in lactating patients, there is low concern due to minimal systemic absorption during these procedures [47].

CONCLUSION

This review provides an updated summary of existing literature on acne treatments during pregnancy and lactation. Considerations for the safety of acne treatments should begin in the preconception period, in which patients should avoid medications contraindicated during the first trimester. During pregnancy, treatment selection should take a stepwise approach and consider acne severity, trimester-specific teratogenic risks, and relevant maternal and fetal medical history. First-line treatment recommendations for mild-to-moderate acne during any phase of pregnancy or lactation include azelaic acid, benzoyl peroxide, or topical clindamycin. For moderate-to-severe or refractory acne, regimens should incorporate oral therapies, including certain antibiotics based on trimester-specific safety or procedural treatments, such as intralesional steroids or light and laser therapies. Some therapies contraindicated during pregnancy are safe once in the postpartum period, regardless of lactation status, including topical retinoids. This review serves as a reference for patient-physician decision-making on acne management during pregnancy and lactation. Individual treatment plans should be tailored to the needs and medical history of each patient.

Nonetheless, there remain limited safety data on common acne treatments during pregnancy and lactation, and available evidence is often inconsistent and vague. Pregnant and lactating patients are underrepresented in clinical trials for acne therapies, and separate trials for these populations may be warranted [105]. Furthermore, due to the ambiguity and inconsistency of current treatment recommendations, the development of consensus-based guidelines for acne management in pregnant and breastfeeding patients would provide

substantial benefit and provide a foundation for creating safe treatment plans in these special populations.

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