IN-DEPTH REVIEW

A Holistic Approach to Treatment of Rosacea During Pregnancy: A Systematic Review

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ABSTRACT

Background: Rosacea is a chronic inflammatory skin condition that is commonly exacerbated during pregnancy. Many patients suffer from emotional distress as a result of their rosacea, but the standard treatment options can cause harm to a developing fetus.
Methods: A systematic review was conducted on PubMed and EMBASE using the keywords "rosacea," "pregnancy," "treatment," "holistic," "edema, and "osteopathic manipulative treatment" (OMT). 113 papers were extracted and screened to determine eligibility based on inclusion criteria: primary studies, rosacea diagnosis, and documented treatment. Papers with both pregnant and nonpregnant patients were included to get a complete understanding of all rosacea treatment options. Those that did not meet criteria were excluded and 20 papers remained for this review.
Results: The 20 included sources had a total of 230 participants who presented with rosacea fulminans (RF) or rosacea-associated edema. Treatment options included antibiotics, steroids, topical antiseptic, wet compresses, and OMT. Of the patients who were pregnant, complications included ocular perforation, corneal transplant, fetal arrhythmia, oligohydramnios, and intrauterine death. Some patients even elected for termination of pregnancy due to rosacea-related anxiety and depression.
Discussion: The emotional distress that these patients faced and physical harm to their babies confirms the need for a holistic approach to treating rosacea during pregnancy. An expected limitation is that some of these complications may be the result of chance, while others may have been due to medications used. It was concluded that pregnancy-safe antibiotics or low-dose topical steroids in combination with OMT or holistic management would be the most effective approach.

INTRODUCTION

Rosacea is a chronic inflammatory skin condition with features including persistent facial erythema, flushing, telangiectasia, papules/pustules and phymatous changes. Rosacea was originally classified into four subtypes including erythrotelangiectatic, papulopustular, phymatous and ocular, but now, naming is according to phenotypic presentation which allows for a more individualized qualification of disease.[1,2]

The pathogenesis of rosacea is multifaceted and largely undetermined, creating challenges in disease management. Mechanisms include immune dysregulation,

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neurovascular reactivity, skin barrier dysfunction and demodex infestation, genetics, and certain environmental triggers. The different manifestations have varying pathophysiologic mechanisms - for example, telangiectasia results from neurovascular dysregulation, while papules result from an overactive Th1/Th17 proinflammatory response.[3] Treatment is targeted at the patient's unique combination of phenotypic presentations. Aside from gentle cleansing and daily UV protection, there are several FDA approved oral and topical agents. Of those approved, brimonidine and oxymetazoline may be used in individuals with erythema and flushing.[2] Topical ivermectin, metronidazole, minocycline, sodium sulfacetamide, azelaic acid, and encapsulated benzoyl peroxide along with oral doxycycline have shown benefit in the treatment of papular/pustular presentations. [2] Some off label options include isotretinoin, oral beta blockers, cromolyn (for its mast cell stabilizing effects) and hydroxychloroquine.[1-3]

Pregnancy poses a unique challenge for providers considering the possible exacerbation of disease and caution needed with therapeutic options. Topical treatments are preferred during pregnancy for less systemic absorption.[4]

Rosacea fulminans is a subtype of rosacea with rapid onset of facial papules, pustules, nodules and cysts, often affecting pregnant individuals. Isotretinoin and systemic steroids have limited use in the pregnant patient, considering isotretinoin is absolutely contraindicated and oral steroids should be used at a low dose.[1]

OMT, osteopathic manipulative treatment, is patient-centered care with a focus on manual modalities to treat somatic dysfunction. Somatic dysfunctions are defined as disruptions to the skeletal, arthrodial and myofascial structures and related vascular, lymphatic, and neural elements.[5] OMT serves as a unique adjunctive treatment approach to the pregnant patient with exacerbated skin disease. Rosacea-associated edema presents on a scale of varying severity, from mild erythema and edema to the most severe form being Morbihan's disease. Morbihan's disease is a severe form of indurated facial edema present in the centrofacial region. Several case reports have evaluated the efficacy of manual therapy in the reduction of rosacea-associated edema.[6–8]

Rosacea has a strong psychosocial effect and may cause emotional distress.[9] Facial appearance can directly affect the self-esteem of patients due to fear of social judgment. This leads to avoidance of social situations and the development of psychiatric comorbidities, including anxiety and depression, which can ultimately limit career or social development. Physicians may overlook rosacea's impact. However, it has the potential to affect patients' mental health, impacting daily life.

This ties into the biopsychosocial model of care which focuses on the complex interaction between the biological, psychological, and social factors that contribute to illness.[6] The goal of this model is to improve treatment planning and outcome. When evaluating a patient with rosacea, it is important to look at the whole patient and evaluate how this disease may be affecting the psychological and social aspects of their life. The purpose of this review is to explore holistic and safe options for the treatment of pregnant patients who may be struggling physically or mentally from their rosacea.

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METHODS

In this systematic review, treatment methods were assessed in patients suffering from rosacea, rosacea fulminans, and rosacea-associated edema for their effectiveness in both pregnant and non-pregnant patients. Drug safety profiles and holistic methods were reviewed, and this data was used to give an update on which methods are safe and effective for pregnant patients. A search was performed on databases including PubMed and EMBASE using the key words "rosacea," "pregnancy," "treatment," "holistic," "edema," and "osteopathic manipulative treatment" (OMT). These terms were used in various combinations using advanced searches, specifying AND or OR, on both databases. A total of 113 papers were extracted through September 8, 2023. Titles and abstracts were screened to determine eligibility based on inclusion and exclusion criteria by two independent reviewers. Papers were only included if they were primary studies that specified treatment of a form of rosacea, for example rosacea fulminans (RF), erythematotelangiectatic rosacea, and rosacea-associated edema. Treatments that involved combinations of multiple medications, either topical or oral, as well as holistic or OMT were included as well. Articles where rosacea was not the focus or treatment was not mentioned were excluded, as well as reviews or secondary papers. The decision was made to include papers with both pregnant and nonpregnant patients to get a complete understanding of all possible rosacea treatment options. In total, 20 papers investigating the most effective treatments for rosacea fit the inclusion criteria and full text screenings were performed by two independent reviewers.

RESULTS

Of the 20 papers that were reviewed, there were a total of 230 participants and the studies had an average age of 28.48, with patient ages ranging from 22 to 72 years old (**Table 1**).[8,10–28] However, two of the papers included did not specify the number of participants in the study. 62.71% of patients presented with RF. The percentage of patients with rosacea-associated edema could not be calculated as it was not clearly specified how many patients presented with edema in each study. However, a total of four out of the 20 papers included mentioned patients with rosacea-associated edema. In addition to RF and edema, there were multiple other rosacea characteristics found in a smaller group of patients. This includes ocular findings, hyperpigmentation, mild redness and flushing, telangiectasia, phymatous skin changes, and rhinophyma.
In terms of treatment, a variety of topical and oral medications were used by patients (Table 1). Of the 20 papers, one paper did not specify the type of treatment, 11 used a combination of antibiotic treatment and steroids, and 8 used antibiotics only.[8,10–28] In addition to antibiotics and steroids, many patients were told to use over the counter (OTC) topical antiseptic and wet compresses. One study with the largest patient population (N = 108), used a combination of in-office treatments including cryotherapy, dermabrasion, electrosurgery, tumble dry laser, and carbon dioxide laser. One study used OMT for treatment of rosacea-associated edema.

In this review, 12 of the papers reported on patients who were pregnant, seven reported on patients who were not pregnant, and one did not specify. The treatment results varied (**Table 1**). Out of the 20 included papers, 13 reported that patients cleared with the use of

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Table 1. Literature Review Data.

Author	N	Average Patient Age	Rosacea Characteristics	Treatment	Treatment Result	Pregnancy Status
Markou AG, Alessandrini V, Muray JM, Begon E, Fysekidis M.[10]	1	37	RF, ocular findings	Oral: prednisone & azithromycin	Cleared after pregnancy	No complications specified
Fuentelsaz V, Ara M, Corredera C, Lezcano V, Juberias P, Carapeto FJ.[11]	1	33	RF	Topical: fusidic acid, mupirocin, erythromycin, betamethasone Oral: azithromycin	Cleared	No complications specified
Demir O, Tas IS, Gunay B, Ugurlucan FG.[12]	1	22	RF	Topical: fusidic acid cream Oral: Amoxicillin-clavulanic acid 1 gr/day Holistic: wet compresses	Cleared	Fever, malaise at week 6
Lewis VJ, Holme SA, Wright A, Anstey AV.[13]	1	28	RF	Oral: erythromycin, systemic prednisolone	Cleared	Gestational diabetes, fetal arrhythmia, oligohydramnios, Intrauterine death
Garayar Cantero M, Garabito Solovera E, Aguado García Á, Valtueña J, Ruiz Sánchez D, Manchado López P.[14]	1	28	RF	Topical: mupirocin, zinc oxide, erythromycin, metronidazole Oral: erythromycin,, metronidazole, amoxicillin, prednisone, permethrin cream	Cleared from permethrin cream	No complications
Ferahbas A, Utas S, Mistik S, Uksal U, Peker D.[15]	1	31	RF	Oral methylprednisolone Holistic: wet compresses, Topical: Fusidic cream, metronidazole, Surgical: Drainage of some lesions	Cleared	No pregnancy complications
Jarrett R, Gonsalves R, Anstey AV[16]	3	31.33	RF	Patient 1 (28): Erythromycin, prednisolone Patient 2 (35): Erythromycin, prednisolone Patient 3 (31): Erythromycin	Treatment not effective	Patient 1: Intrauterine death due to corticosteroid use Patient 2: Termination of pregnancy Patient 3: No complications

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Haenen CC, Kouwenhoven ST, van Doorn R.[17]	1	32	RF	Topical: cephalosporin, prednisone, crotamiton cream, ivermectin, cream, sulfacetamide cleanser, azithromycin, metronidazole Injection: triamcinolone intralesional injections Holistic: blue light therapy	Not cleared until isotretinoin was used post-partum	No pregnancy complications
Ranpariya V, Baldwin H.[18]	1	32	RF	Topical: Crotamiton cream, ivermectin cream, sodium sulfacetamide cleanser Oral: Cephalosporin, prednisone	Not cleared until isotretinoin was used post-partum	No pregnancy complications
Cisse M, Maruani A, Bré C, Domart P, Jonville-Bera AP, Machet L[19]	1	32	RF	Not specified	Not cleared until isotretinoin was used post-partum	Needed hormonal stimulation during first 3 weeks of pregnancy with recombinant FSH and LHRH inhibitor No complications during pregnancy Started isotretinoin after birth
de Morais e Silva FA, Bonassi M, Steiner D, da Cunha TV[20]	1	26	RF, ocular findings	Oral: Prednisone, erythromycin	Cleared	Ocular perforation and corneal transplant (L eye)
Korenevska A, Morozova E, Kayumova L, Pinegin V, Ostretsova M[21]	15	36	RF, hyperpigmentation	Topical: benzoyl peroxide 5%, adapalene, metronidazole, ivermectin, exposure to broadband light Oral: zinc	Not specified	Not pregnant
Jay R, Rodger J[8]	1	72	Edema, Redness, flushing	OMT Topical: sulfacetamide sodium 10%, ivermectin-metronidazole-azelaic acid, & aluminum acetate cream Oral: amoxicillin	OMT responsible for clearing	Not pregnant
Wang B, Yuan X, Huang X, Tang Y, Zha Z, Yan B, Yang B,	66	33.79	Erythema, papules	Oral: Hydroxychloroquine, doxycycline	Cleared	Not pregnant

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Zheng, Y, Yuan C, Xie H, Li J[22]						
Thomas S, Luke JD[23]	Not specified	Not specified	Centrofacial erythema, telangiectasias, phymatous skin changes	Topical: Ivermectin, metronidazole	Ivermectin responsible for clearing	Not pregnant
Patel VM, Schwartz R, Lambert WC[24]	Not specified	Not specified	Not specified	Topical: Azaleic acid, Clindamycin, Metronidazole, Benzoyl peroxide	All helped to clear rosacea	Not pregnant, but all products safe for use during pregnancy
Bhatia N, Ahmadyar M, Hansra H, Del Rosso J, Baldwin H, Daniels AM[25]	19	Not specified	Edema, Papulopustular rosacea, erythema, scaling/peeling	Topical: Minocycline gel	Minocycline gel responsible for clearing	Not pregnant
Shangraw S[26]	1	35	facial flushing, erythema, acneiform eruptions	Topical: Metronidazole, azeleic acid Oral: doxycycline	All, natural hormones during pregnancy came with improvement of rosacea, and it worsened after pregnancies	Natural hormones during pregnancy came with improvement of rosacea, and it worsened after pregnancies
Zauli S, Mantovani L, Ricci M, Sarno O, Bettoli V[42]	7	Not specified	Edema, RF	Oral: isotretinoin, 6 participants with systemic/topical corticosteroids	Not specified	Not specified
Thiboutot DM[28]	108	Not specified	Edema, RF, Telangiectasia, Rhinophyma	Topical: Metronidazole, Clindamycin, Oral: Tetracycline, erythromycin, Minocycline, Doxycycline, Ampicillin, Erythromycin, Isotretinoin Other:Cryotherapy, Dermabrasion, Electrosurgery, Turnable dye laser, Carbon diozide laser	Cleared	Not pregnant

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their prescribed treatment. Six of these papers only used antibiotics while the other six used a combination of antibiotics and steroids, and one cleared from OMT. Of the other seven papers, four of the studies documented that patients cleared after their pregnancy was finished from either giving birth or termination of the pregnancy, one paper documented that the patients never cleared, and two did not specify whether or not the medication was effective for their patients.

Of the patients who were pregnant, the following complications were noted, but the reason for these complications was not specified. Maternal complications included fever, malaise, gestational diabetes, ocular perforation, corneal transplant, and required hormonal stimulation. Fetal complications include arrhythmia, oligohydramnios, and intrauterine death. Some patients elected for pregnancy termination due to anxiety and depression as a result of their rosacea. It is expected that some of these complications were the result of chance, while others may have been due to the medications prescribed to patients for their rosacea during pregnancy.

Some of the papers in which pregnancy complications were mentioned cited use of erythromycin (3)[13,16,20] systemic prednisolone (3)[13,15,16] and prednisone (4).[10,14,17,20] In these papers, fetal complications were present in 57% of patients who used erythromycin, 60% in those who used prednisolone, and 25% in those who used prednisone. However, one of these papers did not specify the pregnancy status.

All patients who reached clearance of rosacea used a combination of drugs, except one who reached complete resolution with solely minocycline gel.[25] The most effective medications were not consistent across all cases. However, use of oral medication either on its own or in addition to topical medication was the most effective treatment regimen. The patient who underwent OMT for rosacea-associated edema used topical and oral antibiotics as well, but it was concluded that the OMT was responsible for clearing her condition.[29] Patients who used holistic treatment options also had success when combined with antibiotics and steroids. There were a limited number of patients who used holistic management or a combination of multiple therapies, but these promising results may serve as a baseline for future studies or treatment.

DISCUSSION

It was concluded that a combination of pregnancy-safe OTC or prescription drugs, in combination with OMT or holistic management would be the most effective approach. A variety of oral and topical antibiotics, as well as steroids, were determined to be safe for use during pregnancy (**Table 2**).[30–35] However, many of the prescription drugs used by patients in this review are not considered safe for pregnancy and should be avoided.

Of the drugs that caused fetal complications, it was found that prednisolone and prednisone are not safe at high doses. The specific doses were not always reported, so it is possible that a higher-than-normal dose or non-compliance with medication dosage may have contributed to fetal complications. Additionally, erythromycin contributed to fetal complications for 57% of pregnant patients who reported using it in this review. However, research shows that this drug is safe for use during pregnancy, and the complications were most likely due to combination with prednisone and prednisolone.

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Because the only study that used OMT was in a non-pregnant patient, the effectiveness of OMT on clearing rosacea-associated edema in pregnancy requires further research.[8] However, as a safe tool in the general pregnancy condition,[6,7] OMT may serve as an adjunctive treatment approach to the pregnant patient with exacerbated skin disease. For patients who do not present with edema, other holistic management including heating pads and blue light therapy may be effective alternatives for rosacea treatment.

Combination Therapy

Treatment for rosacea involves both pharmaceutical and holistic methods, with a focus on combination therapies. Pharmaceutical options include topical or oral medication. Non-pharmaceutical options include OMT, cold compresses, and avoidance of triggers.
Combination therapy that targets all features of rosacea has been found to be the most effective.[2] When targeting inflammatory papules and pustules, first line treatment includes azelaic acid, ivermectin cream, metronidazole, and sodium sulfacetamide. One of these topical treatments is typically recommended in combination with oral doxycycline, followed by long-term use of one singular topical therapy alone. This allows for long-term maintenance of the rosacea.[2]

Some success has been shown in treating rosacea-associated edema with oral tetracyclines or isotretinoin.[8] Rosacea-associated edema may be reduced with OMT more effectively than only the use of pharmaceuticals.

Drug Safety

Pregnancy poses a unique challenge. Through literature analysis, a compilation of pharmacologic treatments have been categorized as safe or not safe for pregnancy (**Table 2**).

It is recommended that pregnancy patients start with topical therapy. The most effective single therapy options include metronidazole, benzoyl peroxide, and sulfacetamide.[35] Oral antibiotics that are safe for rosacea treatment during pregnancy include oral penicillins,[30] macrolides, and cephalosporins.[35] Steroids, specifically prednisolone and prednisone, are safe at low doses, otherwise birth defects may result.[35] Zinc oxide is also safe for use during pregnancy because it is inorganic and non-absorbable.[31] A combination of these drugs is most effective for complete clearance. However, the more drugs used, the greater the risk of harm to the fetus.

Oral doxycycline and minocycline are effective for papulopustular rosacea. However, exposure to tetracyclines in utero during the second and third trimesters may result in tooth discoloration and compromised bone growth in the fetus and possible maternal hepatitis.[35]

Retinoids include topical formulations such as adapalene and oral forms like isotretinoin. Although larger studies assessing the safety of topical retinoids do not suggest increased risk of developmental defects with adapalene or tretinoin, mutagenic risk exists for tazarotene. The use of topical retinoids is discouraged, and use of oral retinoids is absolutely contraindicated.[31,32,36]

Mild to moderate topical steroids are safe to treat dermatologic disease of pregnant patients. Betamethasone, despite being of moderate intensity, needs to be considered on a risk to benefit basis because of animal studies showing cleft palate, cephalocele and umbilical hernias.[33] Several large cohort studies have found no statistically significant association between topical steroids of any

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Table 2. The drugs that patients were prescribed in the included papers for rosacea management and their safety during pregnancy.

Pregnancy Safe	Not Pregnancy Safe
Amoxicillin-clavulanic acid[30]	Adapalene[36]
Ampicillin[35]	Betamethasone[33]
Azithromycin[35]	Doxycycline[35] *2nd & 3rd trimesters*
Benzoyl peroxide[35]	Isotretinoin[35]
Cephalosporin[35]	Ivermectin[35]
Crotamiton[35]	Minocycline[35]
Erythromycin[35]	
Fusidic Acid[35]	
Hydroxychloroquine[35] *only safe at low doses*	
Metronidazole[35]	
Mupirocin[35]	
Permethrin[35]	
Prednisolone[35] *only safe at low doses*	
Prednisone[35] *only safe at low doses*	
Sulfacetamide[35]	
Zinc[31]	
Methylprednisolone[33] *only safe at low doses*	
Intralesional corticosteroid injections[34]	

potency in pregnancy and low gestational or birth weights. Adverse effects were solely observed with potent steroids, and this was found at a dose response relationship.[37] Similarly, another study found adverse effects in the individuals given >300g of very potent steroids. Under 200g of a stronger topical steroid, such as clobetasol propionate, did not correlate with any adverse effects.[35] In a 2021 study in Denmark, over a million pregnancies were analyzed, and over 60,000 were exposed to topical steroids of varying strengths. They concluded topical steroids of any strength were not associated with SGA or low birth weight.[37]

For oral corticosteroids, it is recommended to use the lowest dose and duration. A review of systemic steroid use in pregnancy by Bandoli et al. suggests that there is a small increase in the risk of a cleft lip during the first trimester.[38, 39] Prednisone, ideally at doses under 20mg a day, prednisolone, and methylprednisolone are the systemic corticosteroids of choice because of their limited passage through the placenta.[35,40] Intralesional steroids pose low fetal risk due to minimal absorption.[41]

Topical ivermectin shows efficacy for papulopustular phenotype but should be avoided in pregnancy due to potential teratogenicity in animal studies without sufficient human data.[35]

OMT

OMT is an adjunctive treatment proposed to facilitate resolution of rosacea-associated edema. A case report conducted by Jay et al. found that four 10-minute sessions of basic lymphatic-focused OMT led to visibly decreased facial edema.[8] OMT involves a multifaceted approach to patient care taking into account five models of care: biomechanical, neurologic, respiratory-circulatory, behavioral and metabolic.[5] This

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case report focused mainly on biomechanical restrictions and restoring respiratory-circulatory homeostasis with lymphatic approaches including thoracic inlet release, cervical chain drainage, suboccipital decompression, submandibular release, facial effleurage and trigeminal stimulation. After a month of weekly OMT, the patient had visibly reduced facial edema, non-palpable lymph nodes that were previously noticeable, and improved tissue texture quality of cervical muscles.[8] Other reports have commented on the utility of complete decongestive therapy (CDT) in Morbihan's disease.[6,7] CDT consists of lymphatic drainage, compression therapy, facial exercises, skin care and self-care. All cases were reported to have improvement in facial edema, and one case specifically measured an improvement in anxiety scores, body image and facial sensations.[7] These cases detail the importance and efficacy of alternative treatments in the setting of rosacea-associated edema.

Beyond lymphatic approaches for rosacea-associated edema, lymphatic pump treatments can mobilize various chemokines, cytokines, and inflammatory mediators around the time of treatment.[41] Considering rosacea's chronic inflammatory nature, it would be reasonable to consider an osteopathic adjunctive treatment to manage rosacea exacerbations during pregnancy.

Biopsychosocial

Patients suffering from rosacea are at risk of developing psychiatric or psychological comorbidities due to the psychosocial burden of the disease. The severity varies, but generally has a low impact on patients' lives, so it may be overlooked by providers. The biopsychosocial model of care allows physicians to consider the social and psychological impacts that rosacea may have on a patient.

It was found in this review that patients suffered from severe anxiety, depression, and agitation because of their rosacea.[9,16] Some patients were referred to the psychiatric department and prescribed benzodiazepines with minimal relief. One patient opted for termination of her pregnancy due to the severe psychiatric comorbidities that she developed because of her rosacea.[16] This example emphasizes the importance of treating the whole patient and further examining each condition for psychiatric comorbidities. Overall, this review suggests a holistic treatment approach to rosacea in the pregnant patient, which can include pregnancy safe topical and oral medications, noninvasive modalities such as compresses, OMT, and addressing psychiatric comorbidities.

CONCLUSION

The management of rosacea during pregnancy presents a complex challenge that requires careful consideration of both safety and efficacy. This systematic review supports the use of a multifaceted treatment approach, combining pregnancy-safe medications with holistic strategies such as OMT. While many pharmaceutical agents offer therapeutic benefits, the potential for fetal risk requires caution. Although limited data exist on the use of OMT in pregnant patients with rosacea, its safety profile and promising outcomes suggest it may be a valuable addition for managing rosacea-associated edema. The biopsychosocial model of care must be applied to recognize the emotional and psychological burden rosacea can impose on pregnant patients suffering from rosacea. Holistic, patient-centered treatment that addresses both dermatologic and mental

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health needs may lead to improved outcomes and quality of life for patients. Further research should prioritize establishing clearer safety profiles for therapies and expanding the evidence base for non-pharmacologic interventions as an adjunctive treatment.

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References:

1. Zhang H, Tang K, Wang Y, Fang R, Sun Q. Rosacea Treatment: Review and Update. *Dermatol Ther* . 2021;11(1):13-24.
2. Thiboutot D, Anderson R, Cook-Bolden F, et al. Standard management options for rosacea: The 2019 update by the National Rosacea Society Expert Committee. *J Am Acad Dermatol*. 2020;82(6):1501-1510.
3. Fisher GW, Travers JB, Rohan CA. Rosacea pathogenesis and therapeutics: current treatments and a look at future targets. *Front Med*. 2023;10:1292722.
4. Tyler KH. Dermatologic therapy in pregnancy. *Clin Obstet Gynecol*. 2015;58(1):112-118.
5. Seffinger M. *Foundations of Osteopathic Medicine*. 4th ed. Lippincott Williams and Wilkins; 2019.
6. Kutlay S, Ozdemir EC, Pala Z, Ozen S, Sanli H. Complete decongestive therapy is an option for the treatment of Rosacea lymphedema (Morbihan disease): Two cases. *Phys Ther*. 2019;99(4):406-410.
7. Çinar GN, Özgül S, Nakip G, et al. Complex decongestive therapy in the physical therapist management of Rosacea-related edema (Morbus Morbihan Syndrome): A case report with a new approach. *Phys Ther*. 2021;101(9). doi:10.1093/ptj/pzab133
8. Jay R, Rodger J. Resolution of rosacea-associated persistent facial edema with osteopathic manipulative treatment. *JAAD Case Rep*. 2022;28:83-86.
9. Heisig M, Reich A. Psychosocial aspects of rosacea with a focus on anxiety and depression. *Clin Cosmet Investig Dermatol*. 2018;11:103-107.
10. Markou AG, Alessandrini V, Muray JM, Begon E, Fysekidis M. Rosacea fulminans during pregnancy. *Clin Exp Obstet Gynecol*. 2017;44(1):157-159.
11. Fuentelsaz V, Ara M, Corredera C, Lezcano V, Juberias P, Carapeto FJ. Rosacea fulminans in pregnancy: successful treatment with azithromycin. *Clin Exp Dermatol*. 2011;36(6):674-676.
12. Demir O, Tas IS, Gunay B, Gungor Ugurlucan F. A rare dermatologic disease in pregnancy: Rosacea fulminans- case report and review of the literature. *Open Access Maced J Med Sci*. 2018;6(8):1438-1441.
13. Lewis VJ, Holme SA, Wright A, Anstey AV. Rosacea fulminans in pregnancy. *Br J Dermatol*. 2004;151(4):917-919.
14. Garayar Cantero M, Garabito Solovera E, Aguado García Á, Valtueña J, Ruiz Sánchez D, Manchado López P. Use of permethrin in the treatment of rosacea fulminans during pregnancy: One case report. *Dermatol Ther*. 2020;33(3). doi:10.1111/dth.13436
15. Ferahbas A, Utas S, Mistik S, Uksal U, Peker D. Rosacea fulminans in pregnancy. *Am J Clin Dermatol*. 2006;7(2):141-144.
16. Jarrett R, Gonsalves R, Anstey AV. Differing obstetric outcomes of rosacea fulminans in pregnancy: report of three cases with review of pathogenesis and management. *Clin Exp Dermatol*. 2010;35(8):888-891.
17. Haenen CCP, Kouwenhoven STP, van Doorn R. Rosacea fulminans in pregnancy. *Ned Tijdschr Geneeskd*. 2015;159:A8334.
18. Ranpariya V. Unexpected complications: A case of Rosacea fulminans in pregnancy. *Cutis*. 2021;108(1). doi:10.12788/cutis.0290
19. Cisse M, Maruani A, Bré C, Domart P, Jonville-Bera AP, Machet L. Rosacée fulminante au début d’une grossesse par fécondation in vitro et transfert d’embryons (FIVETE). *Ann Dermatol Venereol*. 2008;135(10):675-678.
20. Silva FA de M e., Bonassi M, Steiner D, Cunha TVR da. Rosacea fulminans in pregnancy with ocular perforation. *J Dtsch Dermatol Ges*. 2011;9(7):542-543.
21. Korenevska A, Morozova E, Kayumova L, Pinegin V, Ostretsova M. Influence of a patient’s somatic pathology on skin manifestations encountered by a cosmetologist. *Clin Ter*. 2023;174(5):404-411.

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22. Wang B, Yuan X, Huang X, et al. Efficacy and safety of hydroxychloroquine for treatment of patients with rosacea: A multicenter, randomized, double-blind, double-dummy, pilot study. *J Am Acad Dermatol*. 2021;84(2):543-545.
23. Thomas S, Luke JD. Ivermectin topical. *J Dermatol Nurses Assoc*. 2020;12(2):94-96.
24. Patel VM, Schwartz RA, Lambert WC. Topical antibiotics in pregnancy: A review of safety profiles. *Dermatol Ther*. Published online May 16, 2019:e12951.
25. Bhatia N, Ahmadyar M, Hansra H, Rosso D, Baldwin J, Daniels H. Cutaneous tolerability of novel topical minocycline gel for the treatment of rosacea. *J Clin Aesthet Dermatol*. 2018;11(5):S29-S30.
26. Shangraw S. Papulopustular rosacea improvement in pregnancy: A case report. *J Am Acad Dermatol*. 2017;76(6). doi:10.1016/j.jaad.2017.04.730
27. Zauli S, Mantovani L, Ricci M, Sarno O, Bettoli V. Rosacea fulminans: Personal experience. *J Am Acad Dermatol*. 2011;64(2):AB18.
28. Thiboutot DM. Acne rosacea. *Am Fam Physician*. 1994;50(8):1691-1697, 1701-1702.
29. Hensel KL, Carnes MS, Stoll ST. Pregnancy Research on Osteopathic Manipulation Optimizing Treatment Effects: The PROMOTE study protocol. *J Am Osteopath Assoc*. 2016;116(11):716-724.
30. *Organization of Teratology Information Specialists (OTIS); 1994-. Amoxicillin and Clavulanic Acid*.; 2022.
31. Putra IB, Jusuf NK, Dewi NK. Skin changes and safety profile of topical products during pregnancy. *J Clin Aesthet Dermatol*. 2022;15(2):49-57.
32. *Organization of Teratology Information Specialists (OTIS); 1994-. Topical Acne Treatments*.; 2021.
33. DailyMed - betamethasone dipropionate cream. *National Institutes of Health*.
34. Lockshin MD, Sammaritano LR. Corticosteroids during pregnancy. *Scand J Rheumatol*. 1998;27(sup107):136-138.
35. McMullan P, Yaghi M, Truong TM, Rothe M, Murase J, Grant-Kels JM. Safety of dermatologic medications in pregnancy and lactation: An Update - Part I: Pregnancy. *J Am Acad Dermatol*. Published online January 25, 2024. doi:10.1016/j.jaad.2023.10.072
36. Topical acne treatments. In: Mother To Baby | Fact Sheets. *Mother To Baby | Fact Sheets Organization of Teratology Information Specialists*. Published online 1994.
37. Andersson NW, Skov L, Andersen JT. Evaluation of topical corticosteroid use in pregnancy and risk of newborns being small for gestational age and having low birth weight. *JAMA Dermatol*. 2021;157(7):788-795.
38. Bandoli G, Palmsten K, Forbess Smith CJ, Chambers CD. A review of systemic corticosteroid use in pregnancy and the risk of select pregnancy and birth outcomes. *Rheum Dis Clin North Am*. 2017;43(3):489-502.
39. Chi CC, Wang SH, Mayon-White R, Wojnarowska F. Pregnancy outcomes after maternal exposure to topical corticosteroids: a UK population-based cohort study. *JAMA Dermatol*. 2013;149(11):1274-1280.
40. ACOG committee opinion no. 776: Immune modulating therapies in pregnancy and lactation. *Obstet Gynecol*. 2019;133(4):e287-e295.
41. Schander A, Downey HF, Hodge LM. Lymphatic pump manipulation mobilizes inflammatory mediators into lymphatic circulation. *Exp Biol Med* . 2012;237(1):58-63.
42. Zauli S, Mantovani L, Ricci M, Sarno O, Bettoli V. Rosacea fulminans: Personal experience. *J Am Acad Dermatol*. 2011;64(2).

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