



Evaluation of the Efficacy & Safety of Minocycline in Acne Vulgaris of Adult Patient

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Abstract

Background: The most typical skin condition that affects adolescents and adults is acne. One of the most frequently recommended antibiotic for treating acne vulgaris is Minocycline. Due to major concerns regarding its safety, including skin pigmentation, which can sometimes be irreversible, it has been used less in recent years. Objective: The aim of the was to evaluate the efficacy and safety of Minocycline for the treatment of acne vulgaris in adult patients.

Methods: This cross-sectional study was conducted at tertiary care hospital Dhaka District from June 2021 to July 2022. Minocycline was prescribed to 30 adult patients (3 men and 27 women) to treat their acne vulgaris were enrolled in the study to determine the drug's effectiveness and safety. In moderate cases and severe cases, the prescribed doses of Minocycline were 50 mg and 100 mg, respectively. The average treatment time was 3 months. Every one month the patients were rechecked to assess their post-treatment progress and side effects.

Results: The clinical evaluation of the severity of each patient's acne revealed that according to severity of cases, 15(50.0%) had moderate, 6(20.0%) had moderately severe and 9(30.0%) had severe acne problem and 9 patients (30.0%) reported experiencing side effects. The only significant side effects were pigmentation occurred in 1.2–3.6% of cases, and patients receiving higher doses of minocycline for longer periods of time were noticeably more likely to have it.

Conclusion: Although there is evidence that Minocycline is effective in treating moderate to mildly severe inflammatory acne vulgaris, there is still no proof that it is superior to other widely used treatments. Concerns still exist regarding its safety due to various side effects.

Keywords: Acne vulgaris; Acne treatment; Minocycline; Safety; Side effects

Introduction

The skin disorder known as acne vulgaris (also known as acne) is very widespread and affects a lot of young people and adults throughout their lifespan [1,2]. Up to 20% of patients with severe acne experience lifelong scarring, and many acne patients express feelings of sadness, anxiety, emotional tension, or poor self-image [3]. For the treatment of moderate to severe inflammatory acne, oral antibiotics are prescribed [4,5]. A popular second-line antibiotic for acne vulgaris is minocycline. Its side-effect profile is well recognized, and dosages of 100 mg daily are frequently

recommended. For certain patients, daily doses of up to 200 mg are necessary to treat their acne [6,7]. Like other tetracyclines, minocycline can occasionally result in increased intracranial pressure, hepatitis, and nephritis as well as gastrointestinal disturbances, candida infections, and hepatitis [8-10]. Minocycline is strongly lipophilic, very soluble, very permeable, and completely metabolized [11]. Minimal effects of food on absorption are achieved via high solubility and permeability [12,13]. Due to the high absorption rate, Minocycline is safe and advantageous in many ways, including the ability to be taken with meals, which may boost patient compliance, the need for smaller

dosages, and the fact that less active medication is left in the GI tract [14]. But a thorough analysis of the literature reveals that Minocycline is not superior to other tetracyclines in treating acne. Minocycline has a superior pharmacokinetic profile than first-generation tetracyclines and is less phototoxic than doxycycline [15]. However, this study is aimed to evaluate the safety and efficacy of minocycline for the treatment of moderate to severe acne vulgaris in adult patients.

Pharmacology: Minocycline has been used therapeutically as a second-generation, semi-synthetic tetracycline with antibacterial activity which retains the efficacy against both gram-positive and gram-negative bacteria, for more than 40 years [16,17]. Open clinical studies have supported the use of Minocycline in the treatment of non-infectious forms of dermatitis, including inflammatory acne, rosacea, bullous dermatoses, and neutrophilic dermatoses [18,19]. It is easily absorbed from the digestive tract, strongly protein bound, fat soluble, and unlike other tetracyclines, does not bind calcium from dairy products [20]. However, Minocycline is linked to systemic side effects that might lead to medication termination. These side effects include gastrointestinal disruption, hypersensitivity reaction, weakness, vertigo, and pigmentation [21,22].

Methodology

A cross-sectional descriptive study was performed among adult patients (above 18 years) came for the treatment of acne vulgaris in the tertiary care hospital Dhaka District from June 2021 to June 2022 were selected by purposive sampling. Thereafter, they were scrutinized according to eligibility criteria and 82 patients receiving minocycline at doses of 50 mg daily, 50/100 mg on alternate days, and 100 mg daily were enrolled in the study to determine the drug's effectiveness and safety. Patients were followed on every month. The severity of each adverse effect was evaluated, and any treatments were recorded. The dosage, time of commencement, and total cumulative dose of Minocycline at which a side effect manifested itself were all noted. Additionally performed tests included full blood count, blood urea, electrolytes, and liver function. After collection, the data were checked and cleaned, followed by editing, compiling, coding and categorizing according to the objectives and variable to detect errors and to maintain consistency, relevancy and quality control. The choice of treatment was made by the patient after a full discussion with the multidisciplinary team consisting of Transfusionists. The data for this study about had been accumulated from patients' medical information. Statistical evaluation of the results used to be got via the use of a window-based computer software program devised with Statistical Packages for Social Sciences (SPSS-24).

Results

The second-line antibiotic Minocycline is frequently used to treat acne vulgaris. Its side-effect profile is well understood, and it is frequently recommended at doses of 100 mg daily. In this study, however, the dose was increased to 100 mg in some circumstances.

Table 1: Demographics of the patients (n=30).

Demographic profile	n=30	%
Age groups (in years)		
18-28	14	46.67
29-38	9	30.0
39-45	7	23.33
Gender		
Male	3	10.0
Female	27	90.0
Severity of cases		
Moderate	15	50.0
Moderately severe	6	20.0
Severe	9	30.0

Table 2: Side effects reported by patients participated in the study.

Side effects	Minocycline (50mg) (n=15)	Minocycline (50/100 mg) (n=6)	Minocycline (100mg) (n=9)
Gastrointestinal symptoms	1(1.2%)	1(0.6%)	1(0.6%)
Vestibular dysfunction	1(0.6%)	-	-
Headache and visual disturbance (*BIH)	-	-	1(0.6%)
Vaginal candidiasis	-	1(0.6%)	-
Cutaneous symptoms (urticaria, photosensitive rash, pruritus)	1(0.6%)	-	1(0.6%)
Pigmentation	1(1.2%)	1(0.6%)	2(1.2%)
Memory disturbance or poor concentration	1(0.6%)	-	-
* BIH = benign intracranial hypertension.			

The average duration of therapy was 3 months, ranging from 1 to 3 months, and the average patient age was 22 years (between 18 and 45 years). In total, 30 adult patients (3 men and 27 women) receiving treatment for acne vulgaris were monitored over a period of three months. The patients were evaluated for progress and any adverse reactions every three months. The acne problem was effectively reduced during follow-up, however some people experienced side effects from using minocycline for a prolonged period of time. A 23 patients (38.33%) reported experiencing side effects (Table 2). According to (Table 1) age group of the patients were between the ages of 18-45 years. Most of the patients 14(46.67%) were in the age group 18-28, 9(30%) were in 29-38 age group and 7(23.33%) were in 39-48 age group. According to gender distribution, 3(10.0%) of these patients were male, whereas 27(90.0%) were female. According to severity of cases, 15(50.0%) had moderate, 6(20.0%) had moderately severe and 9(30.0%) had severe acne problem. According to primary findings after clinical evaluation of each patient's acne severity, 15(50.0%) were moderate cases who were prescribed 50mg of Minocycline daily, 6(20.0%) were diagnosed as moderately severe who needed a dose of 50/100 mg on alternate days, and 9 patients with severe condition (30.0%) needed a dose of 100 mg daily to treat their acnes. According to (Table 2), those receiving 50 mg of Minocycline daily experienced gastrointestinal symptoms 2(1.2%), vestibular dysfunction 1(0.6%), cutaneous symptoms like urticaria and pruritis 2(1.2%), pigmentation 2 (1.2%) and poor concentration 1(0.6%) respectively. Patients who were taking 50/100 mg on alternate days developed gastrointestinal symptoms 1(0.6%), vaginal candidiasis 1(0.6%), and pigmentation in 2(1.2%) respectively. And those who were taking 100 mg daily experienced gastrointestinal symptoms 1(0.6%), headache 1(0.6%), cutaneous symptoms like photosensitive rash 1(0.6%) and pigmentation 6(3.6%) respectively. There was no statistically significant difference in the side effects that increased with dose ($0.5 > P > 0.1$). The only significant side effects in patients receiving larger doses of minocycline was pigmentation ($P < 0.01$). Patients on 200 mg dose daily showed a 3.6% incidence in pigmentation, compared with 2.4%, and 1.2% in those taking 50 mg/daily and 50/100 mg on alternate days, respectively (Figure 1).

Discussion

Among the second group of semi-synthetic tetracycline analogues is minocycline (7-dimethylamino-6-dimethyl-6-deoxytetracycline) used to treat acne vulgaris and the drug is effective against both gram-positive and gram-negative bacteria [16,17]. In total 60 patients participated in our study reported gradual improvement after taking minocycline for the treatment of acne vulgaris. This

study reported a number of side effects developed after taking minocycline orally.

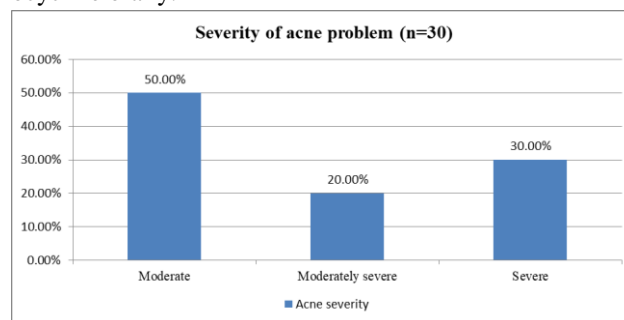


Figure 1: Primary findings after clinical evaluation of each patient's acne severity.

This study revealed various adverse effects like gastrointestinal symptoms, Vestibular dysfunction, benign intracranial hypertension, Vaginal candidiasis, Cutaneous symptoms (urticaria, photosensitive rash, pruritus) and poor concentration. Literature reported that minocycline linked to systemic side effects, such as GI issues and hypersensitivity reactions, cutaneous symptoms, weakness, vertigo, headache, and pigmentation [6,21-22]. A rare but well-known side effect of minocycline is benign intracranial hypertension and, in this study, it has been reported to happen after 16 months use of 200mg of minocycline, this typically happens within 4 weeks [23]. In our patients, pigmentation occurred in 1.2–3.6% of cases, and it was notably more common in those receiving greater doses of minocycline. This usually is associated with a large cumulative dose over several months. According to earlier studies, the incidence of pigmentation in acne patients ranges from 2.4 to 5.6% [6,24-25]. It is generally known that minocycline can lead to skin pigmentation. Bone, tooth, and soft tissue pigmentations are known side effects of minocycline, which is extensively used to treat inflammatory acne, frequently over a long period of time [26-27]. When the cumulative dose is less than 50 gm, diffuse pigmentation rarely happens, but it happens more frequently with a total dose of 100 gm. Our study involved those patients who had taken 100-200mg of minocycline and result showed pigmentation was a noticeable side effect of longer-term treatment in patients receiving higher dosages of minocycline. Side effects were more common in female than in male. The patients participated in this study experienced numerous adverse effects, mostly minor side effects. Higher doses of minocycline were not observed to result in an increase in side effects, with the exception of pigmentation. We are unable to draw general conclusions our findings due to the small sample size. Since there are still questions about its safety due to a variety of side effects, more research is needed.

Limitations of the Study

The present study was conducted in a very short period due to time constraints and funding limitations. The small sample size was also a limitation of the present study.

Conclusion

In conclusion, people treated with Minocycline experienced an improvement in their acne. It was efficacious and well-tolerated when taken for the treatment of moderate to severe acne in adult patients. However, a number of negative effects were noted in this study that is why concerns about its safety persist. The only inference we could draw from the data was that individuals receiving minocycline for acne are considerably more likely to experience side effects.

Recommendations

A multicenter double blinded study in the divisional/ tertiary hospitals of whole Bangladesh can reveal the real picture. The study period should be long. Multi-disciplinary approach of research work can make a study precise & more authentic in this regard.

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Ethical approval: The study was approved by the informed consent of the participant patients.

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SUNTEXT REVIEWS

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