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ORIGINAL RESEARCH

Real-World 6-Month Treatment Outcomes of Faricimab in Turkey: The FARTURK Study

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ABSTRACT

***Introduction*:** This work aims to evaluate the real-world efficacy and safety of intravitreal faricimab over a 6-month follow-up period.

***Methods*:** Data from 38 centers across Turkey were retrospectively analyzed between November 22, 2024, and May 4, 2025. Patients who received at least one intravitreal faricimab injection and had complete ophthalmic and optical coherence tomography (OCT) data with a minimum 1-month follow-up were included. Demographics, diagnosis, macular neovascularization (MNV) subtype, prior treatments, best-corrected visual acuity (BCVA-decimal/ETDRS), central macular thickness (CMT), intra/subretinal fluid,

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MNV size, injection number, follow-up duration, and ocular/systemic adverse events were recorded at baseline, at week 2, and at month 1 after the first injection, after three injections, and at the final visit.

***Results*:** A total of 351 eyes from 316 patients were analyzed, including neovascular age-related macular degeneration (nAMD) (72.1%), diabetic macular edema (DME) (18.2%), retinal vein occlusion (RVO) (6.0%), and other MNV subtypes (3.7%). When comparing pre-treatment and final visits, naïve eyes showed a CMT reduction of 105.63 ± 114.89 µm ($p < 0.001$), while switch eyes had a CMT reduction of 86.58 ± 108.36 µm ($p < 0.001$). The total ETDRS letter gain from baseline to final visit was 16.3 ± 12.08 ($p < 0.001$) in naïve eyes and 8.3 ± 12.23 ($p < 0.001$) in switch eyes. Intraretinal and subretinal fluid rates significantly decreased ($p < 0.001$), and MNV area contracted on OCTA ($p < 0.001$). Only one mild, self-limited intraocular inflammation case (0.16%) occurred.

***Conclusions*:** Faricimab demonstrated rapid and significant anatomical and functional improvements in 6-month real-world data, evident as early as 15 days after the initial injection, with a safety profile comparable to phase III trials. These findings support faricimab as a potent and reliable therapeutic option in the real-world management of nAMD and DME, though extended follow-up is needed to assess long-term outcomes.

Keywords: Diabetic macular edema; Faricimab; Neovascular age-related macular degeneration; Real-world; Retinal vein occlusion

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Key Summary Points

Why carry out this study?

Randomized controlled trials may not fully reflect routine clinical practice, highlighting the need for real-world evidence on the early effectiveness and safety of faricimab after its approval.

This multicenter national study aimed to evaluate early anatomical and functional outcomes of faricimab in patients with neovascular age-related macular degeneration (nAMD), diabetic macular edema (DME), and retinal vein occlusion (RVO) under real-world clinical conditions in Turkey.

To determine whether faricimab provides early real-world anatomical and functional benefits in patients with nAMD, DME, and RVO

What was learned from the study?

Faricimab provided early anatomical and functional benefits, with improvements observed as early as day 15, including reductions in central macular thickness and retinal fluid.

These real-world findings support faricimab as an effective and feasible treatment option in routine clinical practice for patients with nAMD, DME, and RVO.

INTRODUCTION

Macular edema (ME) is a clinical condition that can develop secondary to various retinal vascular diseases, including diabetic maculopathy, retinal vein occlusion (RVO), and neovascular age-related macular degeneration (nAMD). It is a primary cause of vision loss in these diseases. Despite the attempts to elucidate the pathophysiology of ME, which is clinically characterized by intraretinal fluid accumulation, through disease-specific mechanisms, vascular endothelial growth factor (VEGF) has been identified as the most critical mediator of this process [1–3]. The advent of intravitreal injections of anti-VEGF agents has precipitated a paradigm shift in the management of ME, with these injections becoming the primary treatment modality [4].

Anti-VEGF therapies have had a substantial impact on the treatment paradigm for other common causes of ME, including diabetic macular edema (DME) and RVO, in addition to nAMD. These therapeutic interventions present to physicians a viable and comparatively innocuous alternative for the preservation or enhancement of visual acuity [3, 5]. For instance, studies have documented up to a 50% reduction in the incidence of legal blindness among patients with nAMD following anti-VEGF therapy [6]. According to the Food and Drug Administration (FDA) approval sequence, pegaptanib, ranibizumab, aflibercept, and brolucizumab are classified as first-generation anti-VEGF agents [7, 8].

The necessity to alleviate and reduce the substantial treatment and follow-up demands experienced by patients with nAMD has led to a significant focus on the development of longer-acting molecules [4, 9]. Faricimab, the most recent second-generation anti-VEGF agent developed for this purpose, has recently been approved by the FDA for clinical use. Faricimab is distinguishable as the first and only bispecific antibody that targets both VEGF-A and angiopoietin-2 (Ang-2). Ang-2 competitively inhibits the vasoprotective effect of Ang-1 on the Tie2 receptor and potentiates the effects of VEGF, thereby increasing vascular permeability. Consequently, it is hypothesized that the concurrent inhibition of VEGF and Ang-2 may yield a more robust anti-exudative and anti-angiogenic effect [4, 8, 10, 11]. Phase III studies, including TENAYA and LUCERNE (nAMD), RHINE and YOSEMITE (DME), have built upon this theoretical foundation, demonstrating the feasibility of injection intervals of up to 12–16 weeks with faricimab [12, 13].

Despite the robust efficacy and safety profiles demonstrated in phase III trials, discrepancies between randomized controlled trial outcomes and real-world data have been increasingly recognized for several anti-VEGF agents following their integration into routine clinical

practice. Adverse events that are uncommon or not detected in clinical trials may become evident in broader and more heterogeneous patient populations during real-world use [14, 15]. In this context, following the approval of faricimab for clinical use in Turkey, the present study aimed to evaluate 6-month real-world anatomical and functional outcomes based on data collected from multiple tertiary referral centers, and to compare these findings with those reported in phase III clinical trials.

METHODS

Ethical approval for this retrospective, multicenter, observational clinical study was obtained from the Bezmialem Vakıf University Ethics Committee (Approval ID: E-54022451-050.04-206890). The study was conducted in accordance with the principles of the Declaration of Helsinki (1964) and its subsequent amendments. Informed consent to participate was obtained from all individual participants included in the study.

The coordinating center of the study was the Ophthalmology Department of Prof. Dr. Cemil Taşcıoğlu City Hospital. Data from patients who met the predefined inclusion criteria were collected from 38 centers across Turkey. Patients aged between 25 and 95 years who were diagnosed with macular neovascularization (MNV), RVO, or DME, and received at least one intravitreal injection of faricimab (0.05 ml, 120 mg/ml) between November 22, 2024, and May 4, 2025, were included in the study. Patients were excluded if they had any additional macular or retinal pathology, a history of vitrectomy for any reason, did not have regular follow-ups, had less than 4 weeks of follow-up data after injection, or had incomplete records.

Data were collected using a standardized survey form completed by the responsible physicians at each center. Patients were followed regularly throughout the study period, and at each visit, comprehensive ophthalmic examinations were performed, including best-corrected visual acuity (BCVA) assessment, anterior segment slit-lamp biomicroscopy, intraocular pressure measurement using Goldmann applanation tonometry, indirect ophthalmoscopy, and optical coherence tomography (OCT). The following parameters were extracted from patient records: age, sex, intraocular lens status, brand and model of the OCT device used for follow-up, prior anti-VEGF treatment status (naïve or switch), type and number of previous anti-VEGF agents for switch patients, and the diagnosis (MNV, RVO, or DME). For patients in the MNV group, the MNV subtype was additionally recorded. Macular imaging was performed using commercially available spectral-domain or swept-source optical coherence tomography (OCT) systems across participating centers, including Heidelberg Spectralis OCT (Heidelberg Engineering, Germany), Topcon DRI OCT-1 Triton / Atlantis (Topcon Corporation, Japan), Cirrus HD-OCT (Carl Zeiss Meditec, Germany), Optopol SOCT Copernicus REVO (Optopol Technology S.A., Poland) and RS-3000 Advance 2 (Nidek Co., Japan). All measurements were obtained using the manufacturers' built-in software and standard scanning protocols routinely applied in clinical practice. Conversion was performed based on the Giani et al. and Xiong et al. publications [16, 17].

Subgroup evaluations were performed as follows:

MNV subgroup: Intraocular pressure, best-corrected visual acuity (BCVA-ETDRS/decimal/logMAR), central macular thickness (CMT), presence of intraretinal and/or subretinal fluid (IRF/SRF), and MNV size detected on OCT-angiography (OCTA) were evaluated at baseline, week 2 when available (i.e., in centers routinely performing an early post-injection assessment), month 1, month 3, and/or last visit.

RVO and DME subgroup: At the same time points, intraocular pressure, BCVA, CMT, and IRF/SRF presence were recorded. Analyses were initially performed on the overall study cohort to capture real-world treatment patterns, followed by stratified analyses according to disease subtype (nAMD and DME).

The data obtained through the survey were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) software by the principal investigators. The distribution

of variables was assessed both visually (via histograms and probability plots) and analytically (using the Kolmogorov–Smirnov and Shapiro–Wilk tests) to determine normality. Descriptive statistics for normally distributed variables were expressed as means and standard deviations. Comparisons among groups were made using one-way ANOVA for normally distributed variables, and the Kruskal–Wallis test was applied for non-normally distributed data. Levene's test was employed to evaluate the homogeneity of variances. A p value of less than 0.05 was considered statistically significant. In cases of overall significance, pairwise comparisons were performed using Tukey's post hoc test. Correlation analyses were conducted using Pearson or Spearman correlation coefficients, depending on the distribution characteristics of the data.

RESULTS

A total of 351 eyes from 316 patients were included in the study, with a total of 625 faricimab injections administered. The mean age of the patients was 70.5 ± 11.8 years, and 51.9% were male, while 48.1% were female. There were 72 treatment-naïve eyes and 279 previously treated (switch) eyes. The agents used prior to switching were aflibercept in 215 eyes, ranibizumab in 25, bevacizumab in 31, and

Table 1 Demographic findings of the study population

	Mean and SD	**Range**
Age (years)	70.56 ± 11.81	25–95
	Group	***N*** **(%)**
Gender	Male	187 (53.3)
	Female	164 (46.8)
Previous treatment	Aflibercept	215 (61.25)
	Ranibizumab	25 (7.12)
	Bevacizumab	31 (8.83)
	Dexamethasone	8 (2.28)
	Treatment-naïve	72 (20.51)
Diagnose	nAMD	253 (72.1)
	DME	64 (18.2)
	RVO	21 (6.0)
	Other types of MNV	13 (3.7)
Types of MNV	Type 1	177 (69.5)
	Type 2	61 (24.0)
	Type 3	4 (1.48)
	PCV	10 (4)
	Mixed	1 (0.49)

DME diabetic macular edema, *MNV* macular neovascularization, *nAMD* neovascular age-related macular degeneration, *RVO* retinal vein occlusion, *SD* standard deviation

dexamethasone in eight eyes. The mean number of previous injections was 11.1 ± 12.4 (Table 1).

The diagnostic distribution was as follows: nAMD in 253 eyes (72.1%), DME in 64 (18.2%), RVO in 21 (6.0%), and other subtypes of MNV in 13 (3.7%). Among patients with nAMD, the classified subtypes were: 177 eyes (69.95%) with type 1 MNV, 61 (24.0%) with type 2 MNV, 4 (1.48%) with type 3 MNV, 10 (4%) with PCV, and 1 (0.49%) with mixed type (Table 1).

When all patients were analyzed together, the mean best-corrected visual acuity expressed in logMAR units was 0.52 ± 0.46 at baseline, improving to 0.41 ± 0.46 at the 2-week visit and 0.39 ± 0.42 at 1 month, with further improvement to 0.27 ± 0.36 at the final visit ($p < 0.001$).

At the 15-day visit, data were available for 113 eyes from 102 patients, including 38 treatment-naïve eyes and 75 switch eyes. Treatment-naïve patients demonstrated a mean visual acuity gain of + 5.8 ± 7.6 letters ($p < 0.001$) and a mean CMT reduction of 119.76 ± 101.24 µm at the 15-day visit. In switch patients, visual acuity increased by + 4.6 ± 8.3 letters ($p < 0.001$) and CMT decreased by 107.00 ± 119.04 µm ($p < 0.001$) at the 15-day visit. After 1 month, CMT reduction and visual acuity gain were 77.05 ± 102.02 µm and + 7.2 ± 8.4 letters ($p < 0.001$) in naïve patients, and 72.47 ± 101.21 µm and + 4.1 ± 7.4 letters ($p < 0.001$) in switch patients, respectively. When comparing pre-treatment and final visits, naïve eyes showed a CMT reduction of 105.63 ± 114.89 µm ($p < 0.001$) and a visual acuity gain of + 16.25 ± 12.08 letters ($p < 0.001$), while switch eyes had a CMT reduction of 86.58 ± 108.36 µm ($p < 0.001$) and a visual acuity gain of + 8.15 ± 12.22 letters ($p < 0.001$) (Table 2). CMT and BCVA changes in the AMD and DME subgroups are presented in Table 3.

Regarding the 3-month visual acuity changes after monthly injection of faricimab, in the

Table 2 Visual acuity, central macular thickness, and intraretinal/subretinal fluid changes in the study groups

Group	Variable	Change in day 15 ($n = 113$)	Change in month 1 ($n = 351$)	Change in final visit ($n = 351$)
Treatment-naïve patients	Visual acuity (ETDRS)	+ 5.8 ± 7.6	+ 7.2 ± 8.4	+ 16.25 ± 12.08
	p value	< 0.001	< 0.001	0.001
	CMT (µm)	− 119.76 ± 101.24	− 77.05 ± 102.02	− 105.63 ± 114.89
	p value	< 0.001	< 0.001	< 0.001
Switch patients	Visual acuity (ETDRS)	+ 4.6 ± 8.3	+ 4.1 ± 7.4	+ 8.15 ± 12.22
	p value	< 0.001	0.001	< 0.001
	CMT (µm)	− 107.00 ± 119.04	− 72.47 ± 101.22	− 86.59 ± 108.37
	p value	< 0.001	< 0.001	< 0.001
	Variable	**Before first injection**	**Month 1**	**Final visit**
Treatment-naïve patients	IRF (%)	83.30	41.20	50.00
	SRF (%)	54.20	22.20	11.50
Switch patients	IRF (%)	72.50	31.90	35.90
	SRF (%)	67.10	35.70	37.90
All patients	IRF (%)	74.50	33.20	38.00
	SRF (%)	65.10	32.50	33.30

CMT central macular thickness, *ETDRS* Early Treatment Diabetic Retinopathy Study letters, *IRF* intraretinal fluid, *µm* micrometers, *n* number of eyes, *SRF* subretinal fluid

Table 3 Central macular thickness and BCVA changes in the AMD and DME subgroups

	Variable	Change in day 15 ($n = 113$)	Change in month 1 ($n = 351$)	Change in final visit ($n = 351$)
DME group	Visual acuity (ETDRS)	+ 5.6 ± 7.4	+ 6.9 ± 8.1	+ 10.8 ± 8.6
	p value	< 0.001	< 0.001	< 0.001
	CMT (µm)	− 130.81 ± 97.89	− 72.73 ± 91.08	− 98.60 ± 118.12
	p value	< 0.001	< 0.001	< 0.001
nAMD group	Visual acuity (ETDRS)	+ 5.4 ± 8.0	+ 7.3 ± 8.5	+ 8.6 ± 8.2
	p value	< 0.001	< 0.001	< 0.001
	CMT (µm)	− 96.03 ± 126.48	− 66.58 ± 92.48	− 78.01 ± 93.16
	p value	< 0.001	< 0.001	< 0.001

nAMD neovascular age-related macular degeneration, *BCVA* best-corrected visual acuity, *CMT* central macular thickness, *DME* diabetic macular edema, *ETDRS* Early Treatment Diabetic Retinopathy Study letters, *µm* micrometers, *n* number of eyes

aflibercept group, mean visual acuity increased from 0.6 ± 0.4 LogMAR at baseline to 0.5 ± 0.3 LogMAR at month 1 and 0.4 ± 0.4 LogMAR at month 3. In the ranibizumab group, values were 0.3 ± 0.3, 0.4 ± 0.3, and 0.3 ± 0.2 LogMAR, respectively. In the bevacizumab group, visual acuity 0.5 ± 0.4 LogMAR at baseline, in month 1 increased to 0.4 ± 0.4 LogMAR, and increased to 0.3 ± 0.2 LogMAR at month 3. Repeated-measures ANOVA showed a statistically significant overall improvement in visual acuity over time ($p < 0.001$). Furthermore, a significant interaction between time and the prior anti-VEGF agent was detected ($p < 0.001$), indicating that the degree of improvement after switching to faricimab varied according to the previous treatment. Notably, visual acuity did not increase substantially in the ranibizumab group (Table 4).

After three consecutive monthly injections of faricimab 3-month CMT changes, the aflibercept group showed a decrease from 409.67 ± 160.95 µm at baseline to 350.10 ± 151.10 µm at month 1 and 311.20 ± 114.60 µm at month 3. The ranibizumab group showed corresponding reductions from 424.62 ± 138.70 µm to 320.62 ± 96.01 µm and 265.25 ± 68.14 µm, while the bevacizumab

Table 4 Visual acuity (LogMAR) and central macular thickness changes in injection groups

	Group	Baseline	Month 1	Month 3	*p* value (change in time)	*p* value (difference in the injection groups)
BCVA	Aflibercept	0.6 ± 0.4	0.5 ± 0.3	0.4 ± 0.4	< 0.001	< 0.001
	Ranibizumab	0.3 ± 0.3	0.4 ± 0.3	0.3 ± 0.2	0.461	
	Bevacizumab	0.5 ± 0.4	0.4 ± 0.4	0.3 ± 0.2	< 0.001	
CMT (µm)	Aflibercept	409.67 ± 160.95	350.10 ± 151.10	311.20 ± 114.60	< 0.001	< 0.001
	Ranibizumab	424.62 ± 138.70	320.62 ± 96.01	265.25 ± 68.14	< 0.001	
	Bevacizumab	449.33 ± 272.72	322.33 ± 143.66	303.33 ± 136.42	< 0.001	

BCVA best-corrected visual acuity, *CMT* central macular thickness, *µm* micrometers

group decreased from 449.33 ± 272.72 µm to 322.33 ± 143.66 µm and 303.33 ± 136.42 µm (Table 4). Repeated-measures analysis confirmed a significant overall reduction in CMT over time ($p < 0.001$), with a significant interaction between time and the previous anti-VEGF agent ($p < 0.001$). This finding suggests that the magnitude of CMT reduction after switching to faricimab differed depending on prior treatment exposure.

In treatment-naïve patients, the presence of IRF and SRF at baseline was 83.3% and 54.2%, which decreased to 41.2% and 22.2% at month 1 and to 50.0% and 11.5% at the final visit. For the switch group, IRF and SRF percentage was 72.5 and 67.1 at the initial visit. These ratios decreased to 31.9–35.7 at month 1 and 35.9–37.9 at the final visit. When all patients were analyzed together, IRF and SRF rates were 74.5–65.1% at baseline, 33.2–32.5% at month 1, and 38.0–33.3% at the final visit (Table 2). Among the 28 patients with OCTA imaging at three visits, the mean MNV area decreased from 906.00 ± 495.44 µm^2 at baseline to 667.37 ± 422.47 µm^2 at month 1 and 530.66 ± 384.30 µm^2 at month 3 (Fig. 1).

Primary outcome analyses were performed in the pooled cohort to reflect real-world clinical use of faricimab, in conjunction with disease-specific subgroup analyses for nAMD and DME.

Adverse event analysis revealed only one case (0.16%) of mild intraocular inflammation presenting as anterior uveitis/vitritis. The inflammatory signs completely resolved after treatment with topical prednisolone acetate five times daily, with visual acuity returning to baseline at the 2-week follow-up. No cases of retinal artery occlusion, retinal vasculitis, or endophthalmitis were observed during the study.

DISCUSSION

Randomized controlled trials, by virtue of their strict patient selection criteria and standardized protocols, do not fully reflect real-world clinical conditions. Consequently, the efficacy and safety profiles of intravitreal agents reported in phase studies may differ when these treatments are applied to more heterogeneous populations

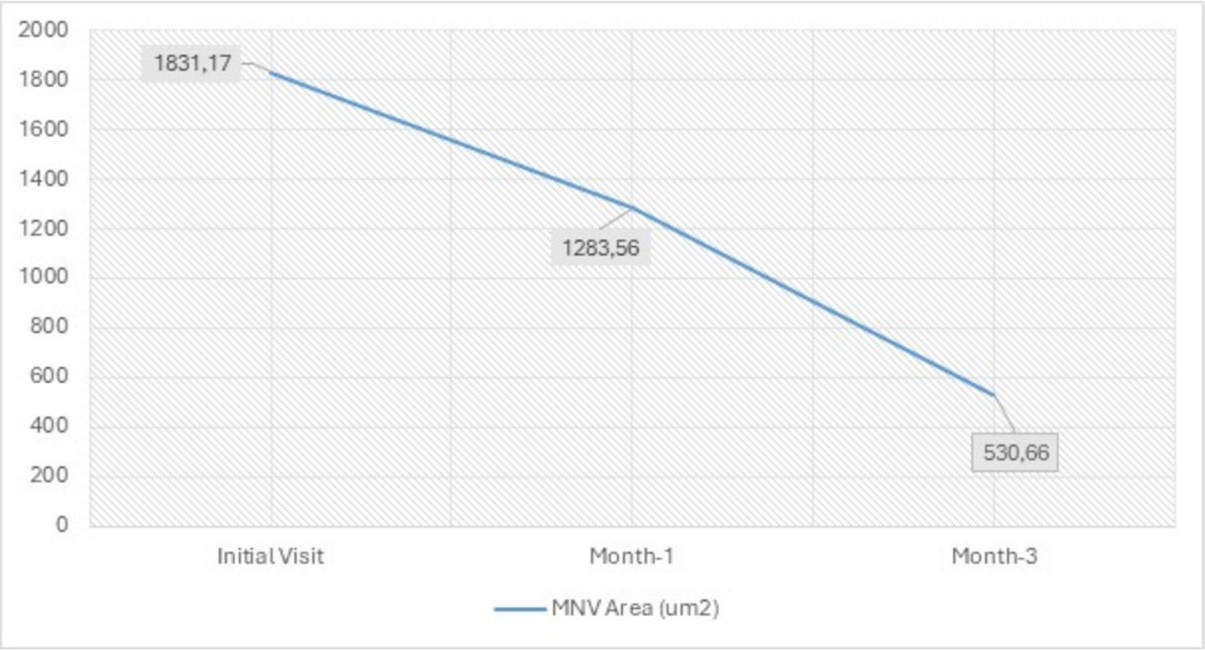


Fig. 1 Mean OCTA-based macular neovascularization (MNV) area at baseline, at month 1, and at month 3 in 28 eyes

in routine practice. Indeed, previous reports have shown that real-world outcomes of several anti-VEGF agents often fail to match phase trial results, and adverse events not observed under controlled research conditions may emerge in broader clinical use. For this reason, our study aimed to objectively evaluate the real-world performance of faricimab within the first 6 months following its approval in Turkey and to assess its consistency with phase trial findings across a large and diverse national patient cohort. The FARTURK study represents the first extensive multicenter national dataset examining real-world outcomes of faricimab in patients with nAMD and DME, and the results indicate that the short-term efficacy and safety profile of the drug is largely consistent with that reported in pivotal clinical trials.

To our knowledge, this is the first study in the literature to demonstrate that faricimab provides a marked anatomical and functional improvement as early as 15 days after the initial injection. At the 15-day visit, visual acuity gains were + 5.8 and + 4.6 letters in the treatment-naïve and switch groups, respectively, while reductions in central macular thickness were 119.76 µm and 107.00 µm. These findings strongly indicate a robust early treatment effect. Whereas most randomized clinical trials report the first efficacy outcomes at 1 month or later, the observation of such rapid improvement in our study suggests that faricimab's dual inhibition of VEGF-A and Ang-2 may promote early vascular stabilization [4, 12, 18]. Notably, even in switch patients who had received an average of 11.4 prior anti-VEGF injections and were considered suboptimal responders, a clear early anatomical improvement was observed. This supports the notion that faricimab may exert a potent short-term anti-edematous effect in real-world practice. Such an early response pattern has important clinical implications, particularly regarding loading dose strategies and the individualization of treatment intervals. On the other hand, while the day-15 results offer valuable information regarding early treatment response, the sample size at this time point was smaller compared to later visits. This was related to routine clinical follow-up patterns. Although this may introduce a degree of selection bias, the overall trends remained consistent with subsequent outcomes.

The improvements in visual acuity and CMT observed in treatment-naïve patients in our study are largely consistent with the outcomes reported in phase III trials. In the YOSEMITE and RHINE studies, faricimab administered every 8 weeks resulted in 10.7–11.8 letters of gain at the end of the first year, while the personalized treatment interval (PTI) arm achieved gains of 11.6–10.8 letters [12]. Similarly, the TENAYA and LUCERNE trials reported 1-year visual gains ranging from 5.8 to 6.6 letters [13]. When the visual acuity change between baseline and the final visit in our naïve cohort is examined, the gains appear to be comparable to those reported in these pivotal studies, with no evidence of inferior performance.

However, the findings regarding CMT reduction present a somewhat different pattern. One-year CMT decreases reported in the YOSEMITE–RHINE trials ranged from − 206.6 to − 195.8 µm in the every-8-week arm and from − 196.5 to − 187.6 µm in the PTI arm [12, 19]. In the TENAYA–LUCERNE trials, these reductions were slightly smaller, at − 136.8 to − 137.1 µm [13, 20]. In contrast, the early-term CMT reduction observed in our naïve patients remained below these values. The discrepancy between CMT reduction and visual acuity gain may stem from the relatively short follow-up period in our study and from measurement variability introduced by the use of different OCT devices across participating centers nationwide. This device heterogeneity is likely a notable limitation in accurately assessing early anatomical response.

When the distribution of IRF and SRF on macular OCT scans was evaluated, IRF and SRF were present at baseline in 83.3–54.2% of treatment-naïve patients and in 72.5–67.1% of switch patients. In nAMD-specific analyses, the TENAYA–LUCERNE trials reported baseline IRF/SRF rates ranging between 47.0% and 68.0% [4, 20]. In our study, fluid rates declined to 41.2–22.2% in the naïve group and 31.9–35.7% in the switch group at month 1, and further to 50.0–11.5% and 35.9–37.9%, respectively, at month 6. Post hoc analyses of

TENAYA–LUCERNE demonstrated that fluid rates decreased to 15.9%/11.9%–39.8%/30.7% at week 4 and to 15.0%/11.6–21.0%/12.1% at week 12 [20]. Similarly, YOSEMITE–RHINE post hoc analyses showed baseline IRF/SRF rates of 99.4–66.0%, which declined to 82.0–4.0% in the every-8-week faricimab arm and 79.0–3.0% in the T&E arm by week 16 [12, 19]. When these findings are considered collectively, they indicate that IRF and SRF resolution occurs rapidly and in similar timeframes across major phase III trials, and our study's findings align closely with these patterns. The higher proportion of patients with residual IRF in our group compared with TENAYA–LUCERNE may be attributable to the inclusion of both DME and nAMD cases in our cohort, as IRF tends to persist longer during the early phase in DME but decreases more substantially with repeated injections over subsequent visits [13, 20].

In our study, the MNV area assessed by OCTA demonstrated a considerable reduction at both the first and third months compared with baseline (906.00 ± 495.44 μm^2 at baseline, 667.37 ± 422.47 μm^2 at month 1, and 530.66 ± 384.30 μm^2 at month 3). This early decreasing trend suggests that faricimab may not only reduce exudation but also modulate the structural characteristics of the neovascular complex. In the literature, comparisons between OCTA and fluorescein angiography (FFA) measurements indicate that FFA typically yields approximately 25% larger MNV areas due to dye leakage that artificially broadens lesion boundaries; nevertheless, both FFA and OCTA have been widely used to assess MNV morphology and treatment response following anti-VEGF therapy [21–25]. Existing studies evaluating faricimab's effects on neovascular complex morphology report variable findings. Chujo et al. reported that in treatment-naïve patients receiving a 3-month loading regimen, vessel area (VA) and junction density showed minimal change on OCTA, with VA increasing only from 0.14 to 0.15 mm^2 [22]. Conversely, Carla et al. observed a clear reduction in both MNV area and vessel area after 1 year of faricimab treatment in naïve and switch cohorts [26]. In light of these findings, the reduction in MNV area observed in our study, similar to that reported by Carla et al., supports the hypothesis that faricimab may influence not only exudation but also the structural dynamics of the neovascular complex [26]. Monitoring changes in MNV area alongside visual and anatomical outcomes may therefore provide valuable insights into treatment response and help refine clinical decision-making.

In terms of safety, the adverse event profile observed in our study was consistent with the findings of phase III trials and other real-world series, with no cases of retinal vasculitis, retinal artery occlusion, or endophthalmitis identified [7, 12, 13, 27, 28]. Only a single instance of mild intraocular inflammation was reported, which resolved completely with follow-up. Nevertheless, the relatively short observation period should be taken into account, as longer-term surveillance may be necessary to fully capture infrequent or delayed-onset adverse events associated with faricimab.

This study has several limitations that should be considered when interpreting the findings. The relatively short observation period may not fully capture the longer-term anatomical and functional trajectory of faricimab treatment, particularly in chronic disease subgroups. In addition, the involvement of multiple centers using different commercially available OCT platforms with distinct segmentation algorithms and measurement definitions may have contributed to variability in OCT-based anatomical parameters, including central macular thickness. Although this heterogeneity reflects routine real-world clinical practice, it should be acknowledged as a potential source of measurement-related variability. OCTA evaluations were available only in a limited portion of the cohort, which may restrict the broader applicability of neovascular complex analyses. Moreover, the number of patients included in subgroup analyses was relatively small, which may limit the robustness of subgroup-specific conclusions.

CONCLUSIONS

The FARTURK study provides the first large-scale national real-world evidence on faricimab use in Turkey, demonstrating that its short-term efficacy and safety profile are largely consistent with pivotal phase III trials. Faricimab yielded significant visual and anatomical improvements as early as 15 days after the first injection, highlighting a robust and rapid therapeutic effect. Both treatment-naïve and previously treated patients benefited, with marked reductions in central macular thickness, fluid compartments, and MNV area. The excellent safety profile, with only a single mild inflammation case observed, supports the clinical reliability of faricimab in routine practice. Nevertheless, longer-term follow-up is warranted to confirm sustained efficacy and to further evaluate rare or delayed adverse events.

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Declarations

Conflict of interest. Akın Çakır, Fevzi Akkan, Ziya Kapran, Melih Ünal, Nigar Şerif, Tahsin Uzundede, Gamze Karataş, Mahmut Öztürk, Hüseyin Dündar, Tansu Erakgün, Mehmet Numan Alp, Nilüfer Koçak, Ali Osman Saatci, Ebru Nevin Çetin, Ali Hakan Durukan, Muzaffer Şahin, Ferşat Muhacir, Seda Yeşiltaş, Osman Murat Uyar, Sinan Emre, Mehmet Ali Şekeroğlu, Mehmet Önen, Mehmet Bulut, Aylin

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Ethical approval. Ethical approval for this retrospective, multicenter, observational clinical study was obtained from the Bezmialem Vakıf University Ethics Committee (Approval ID: E-54022451-050.04-206890). The study was conducted in accordance with the principles of the Declaration of Helsinki (1964) and its subsequent amendments. Informed consent to participate was obtained from all individual participants included in the study.

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REFERENCES

1. Daruich A, Matet A, Moulin A, et al. Mechanisms of macular edema: beyond the surface. Prog Retin Eye Res. 2018;63:20–68.
2. Spaide RF. RETINAL VASCULAR CYSTOID MACULAR EDEMA: review and new theory. Retina. 2016;36(10):1823–42. https://doi.org/10.1097/IAE.0000000000001158.
3. Campochiaro PA. Molecular pathogenesis of retinal and choroidal vascular diseases. Prog Retin Eye Res. 2015;49:67–81.
4. Heier JS, Khanani AM, Quezada Ruiz C, et al. Efficacy, durability, and safety of intravitreal faricimab up to every 16 weeks for neovascular age-related macular degeneration (TENAYA and LUCERNE): two randomised, double-masked, phase 3, non-inferiority trials. Lancet. 2022;399:729–40. https://doi.org/10.1016/S0140-6736(22)00010-1.
5. Aldokhail LS, Alhadlaq AM, Alaradi LM, et al. Outcomes of anti-VEGF therapy in eyes with diabetic macular edema, vein occlusion-related macular edema, and neovascular age-related macular degeneration: a systematic review. Clin Ophthalmol. 2024;18:3837–51.
6. Bloch SB, Larsen M, Munch IC. Incidence of legal blindness from age-related macular degeneration in Denmark: Year 2000 to 2010. Am J Ophthalmol. 2012. https://doi.org/10.1016/j.ajo.2011.10.016.
7. Khanani AM, Aziz AA, Khan H, et al. The real-world efficacy and safety of faricimab in neovascular age-related macular degeneration: the TRUCKEE study—6 month results. Eye (Basingstoke). 2023;37:3574–81. https://doi.org/10.1038/s41433-023-02553-5.
8. Ng B, Kolli H, Ajith Kumar N, et al. Real-world data on faricimab switching in treatment-refractory neovascular age-related macular degeneration. Life. 2024. https://doi.org/10.3390/life14020193.
9. Penha FM, Masud M, Khanani ZA, et al. Review of real-world evidence of dual inhibition of VEGF-A and ANG-2 with faricimab in NAMD and DME. Int J Retina Vitreous. 2024. https://doi.org/10.1186/s40942-024-00525-9.
10. Wykoff CC, Abreu F, Adamis AP, et al. Efficacy, durability, and safety of intravitreal faricimab with extended dosing up to every 16 weeks in patients with diabetic macular oedema (YOSEMITE and RHINE): two randomised, double-masked, phase 3 trials. Lancet. 2022;399:741–55. https://doi.org/10.1016/S0140-6736(22)00018-6.
11. Downey L, Sivaprasad S, Chhabra R, et al. Dual pathway inhibition with faricimab for previously treated neovascular age-related macular degeneration and diabetic macular oedema: guidance from a UK panel of retina specialists. Eye. 2024;38:3077–86. https://doi.org/10.1038/s41433-024-03223-w.

12. Wong TY, Haskova Z, Asik K, et al. Faricimab treat-and-extend for diabetic macular edema: two-year results from the randomized phase 3 YOSEMITE and RHINE trials. Ophthalmology. 2024;131:708–23. https://doi.org/10.1016/j.ophtha.2023.12.026.

13. Khanani AM, Kotecha A, Chang A, et al. TENAYA and LUCERNE: two-year results from the phase 3 neovascular age-related macular degeneration trials of faricimab with treat-and-extend dosing in year 2. Ophthalmology. 2024;131:914–26. https://doi.org/10.1016/j.ophtha.2024.02.014.

14. Zarbin MA, MacCumber MW, Karcher H, et al. Real-world safety outcomes with brolucizumab in neovascular age-related macular degeneration: findings from the IRIS® registry. Ophthalmol Ther. 2024;13:1357–68. https://doi.org/10.1007/s40123-024-00920-3.

15. Wykoff CC, Matsumoto H, Barakat MR, et al. Review retinal vasculitis or vascular occlusion after olokizumab for neovascular age-related macular degeneration a systematic review of real-world evidence

16. Xiong K, Gong X, Li W, et al. Comparison of macular thickness measurements using swept-source and spectral-domain optical coherence tomography in healthy and diabetic subjects. Curr Eye Res. 2021;46:1567–73. https://doi.org/10.1080/02713683.2021.1908566.

17. Giani A, Cigada M, Choudhry N, et al. Reproducibility of retinal thickness measurements on normal and pathologic eyes by different optical coherence tomography instruments. Am J Ophthalmol. 2010. https://doi.org/10.1016/j.ajo.2010.06.025.

18. Wells JA, Glassman AR, Ayala AR, et al. Aflibercept, bevacizumab, or ranibizumab for diabetic macular edema two-year results from a comparative effectiveness randomized clinical trial. Ophthalmology. 2016;123:1351–9. https://doi.org/10.1016/j.ophtha.2016.02.022.

19. Lim JI, Amador MJ, Dhoot DS, et al. Anatomic control with faricimab versus aflibercept in the YOSEMITE/RHINE trials in diabetic macular edema. Ophthalmol Retina. 2025;9:655–66. https://doi.org/10.1016/j.oret.2025.01.017.

20. Cheung CMG, Lim JI, Priglinger S, et al. Anatomic outcomes with faricimab vs aflibercept in head-to-head dosing phase of the TENAYA/LUCERNE trials in neovascular age-related macular degeneration. Ophthalmology. 2025;132:519–26. https://doi.org/10.1016/j.ophtha.2024.11.023.

21. Haas AM, Ahmed D, Stattin M, et al. Comparison of macular neovascularization lesion size by the use of spectral-domain optical coherence tomography angiography and swept-source optical coherence tomography angiography versus indocyanine green angiography. Acta Ophthalmol. 2021;99:e260–6. https://doi.org/10.1111/aos.14572.

22. Chujo S, Matsubara H, Mase Y, et al. Comparisons of early changes of vascular structure after treatment with faricimab and aflibercept in eyes with macular neovascularization by OCT angiography. Clin Ophthalmol. 2025;19:3527–33. https://doi.org/10.2147/OPTH.S549586.

23. Viggiano P, Grassi MO, Pignataro M, et al. Topographical analysis of the choriocapillaris reperfusion after loading anti-VEGF therapy in neovascular AMD. Transl Vis Sci Technol. 2022. https://doi.org/10.1167/tvst.11.9.18.

24. Faatz H, Lommatzsch A. Overview of the use of optical coherence tomography angiography in neovascular age-related macular degeneration. J Clin Med. 2024. https://doi.org/10.3390/jcm13175042.

25. Costanzo E, Miere A, Querques G, et al. Type 1 choroidal neovascularization lesion size: indocyanine green angiography versus optical coherence tomography angiography. Invest Ophthalmol Vis Sci. 2016;57:OCT307–13. https://doi.org/10.1167/iovs.15-18830.

26. Carlà MM, Scampoli A, Grieco G, et al. Morphometric changes in macular neovascularization architecture after faricimab treatment in neovascular age-related macular degeneration. Retina. 2026;46:125–35. https://doi.org/10.1097/IAE.0000000000004635.

27. Mizuki Y, Inokuchi S, Kuroki T, et al. Two-year real-world outcomes of faricimab for diabetic macular edema in Japan. Clin Ophthalmol. 2025;19:3051–8. https://doi.org/10.2147/OPTH.S547179.

28. Stanga PE, Valentín-Bravo FJ, Stanga SEF, et al. Faricimab in neovascular AMD: first report of real-world outcomes in an independent retina clinic. Eye (Basingstoke). 2023;37:3282–9. https://doi.org/10.1038/s41433-023-02505-z.