


Results of the Heart Failure Management Program at Hue Central Hospital after 1 year of implementation

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ABSTRACT

Background: Heart failure is the consequence of many diseases that cause structural and/or functional disorders of the heart. Having a heart failure management program is essential to ensure patients receive optimal care and can improve clinical prognosis.

Objectives: 1. Describing real-world results of the Heart Failure Management Program at Hue Central Hospital; 2. Surveying the current status of prescribing drugs according to guidelines to treat heart failure in the program.

Studying methods: Implementation time is from July 2022 to September 2023 at Hue Central Hospital. The study design is a cross-sectional descriptive study with short-term longitudinal follow-up for at least 6 months.

Results: There were 734 patients including 445 men (60.6%) and 289 women (39.4%) with a mean age of 65.6 ± 15.4 years. The average follow-up time was 5.16 ± 3.53 months (the longest was 14 months). The prescription rates of ARNi, BB, MRA, SGLT2i were 55.9%, 77.9%, 78.7% và 76.5% respectively. After 6 months of management, these rates are 58.8%, 86.8%, 83.8%, 83.1% respectively. The average initial ejection fraction of the group of patients

followed over 6 months was $34.5 \pm 6.9\%$, after 6 months of management this rate increased to $39.9 \pm 11.9\%$. The rate of rehospitalization due to heart failure decreased by 27.2% in the group of patients followed for more than 6 months. The mortality rate gradually decreased over time, from 4.4% to 1.7% after 6 months of follow-up.

Conclusion: The rate of optimal drug use in heart failure treatment improves over time, the death rate gradually decreases with each stage, but a lot of management measures need to be strengthened to avoid losing track of patients.

Keywords: Heart failure, management, treatment.

INTRODUCTION

Heart failure is an increasingly common condition globally. About 1-4% of hospital admissions for all causes in developed countries are initially diagnosed as heart failure. The average hospital stay for heart failure worldwide is about 5-10 days. Heart failure patients have a high risk of rehospitalization. About 1 in 4 patients over 65 years old need to be rehospitalized within 30 days⁵ and about 44% of patients need to be rehospitalized at least once within 1 year¹⁷. There are many reasons why

heart failure patients need to be rehospitalized, of which 2/3 are potentially modifiable². There are still gaps in clinical practice that affect the efficacy of treatment and quality of life of patients. Therefore, a heart failure management program will be an opportunity to optimize treatment for patients, as well as make the patient journey less fragmented, helping to monitor patients more closely. The efficacy of heart failure management programs has been demonstrated by pooled data from 29 clinical trials showing that heart failure hospitalization rates decreased by 27%, all-cause mortality decreased by 25%, and all-cause hospitalization decreased by 20%⁷. Based on this scientific basis, we conduct this topic with the following objectives:

1. Describe the real-world results of the Heart Failure Management Program at Hue Central Hospital.

2. Survey the status of heart failure treatment prescription according to recommendations in the program.

OBJECTIVES AND METHODS

Patient selection criteria: Heart failure patients ≥ 18 years old being managed in the inpatient and outpatient heart failure management program, with left ventricular ejection fraction $\leq 50\%$.

Exclusion criteria: Patients lost to follow-up in the management program for ≥ 6 months.

Time and place: From July 2022 to September 2023 at the Cardiovascular Center - Hue Central Hospital.

Study design: Cross-sectional descriptive study with short-term longitudinal follow-up for at least 6 months.

Variables: Variables collected using a unified

form for outpatients in the heart failure management program diagnosed with heart failure, retrospectively retrieving data from patients' outpatient records. Research variables include:

- Clinical symptoms of heart failure according to NYHA classification, systolic blood pressure, diastolic blood pressure, heart rate, heart rhythm at follow-up visits.

- Echocardiographic measurements of left ventricular end-systolic diameter (Dd, Ds), ejection fraction (EF) calculation, and estimated pulmonary artery systolic pressure.

- Data on medication use: drug name, dosage, combination of heart failure treatment drugs for each patient at timepoints: after 1 month, after 3 months, after 6 months of treatment in the heart failure program.

- Data on causes of hospitalization, triggering factors for acute heart failure exacerbations in patients (if any).

- For patients lost to follow-up after a period of treatment in the program, contact them by phone to ask about the reason for dropout and current treatment status.

Data analysis and processing: Qualitative variable data are described as percentage, quantitative variables are expressed as mean \pm standard deviation. Data analysis uses SPSS 26.0 software. Mann-Whitney U test and Kruskal-Wallis ANOVA are used for non-parametric tests, with $p < 0.05$ considered statistically significant.

RESULTS

Table 1. General characteristics of study subjects

Characteristics	Reduced EF		Mildly reduced EF		Total		p
	n	%	n	%	n	%	
Male	309	42.1	136	18.5	445	60.6	0.028
Female	178	24.3	111	15.1	289	39.4	
Total	487	66.3	322	39.4	734	100.0	
Age (years)	65.1 \pm 15.6		66.7 \pm 15.0		65.6 \pm 15.4		0.186

Characteristics	Reduced EF		Mildly reduced EF		Total		p
	n	%	n	%	n	%	
Systolic BP (mmHg)	122.01 ± 23.3		124.42 ± 25.4		122.9 ± 24.1		0.402
Diastolic BP (mmHg)	73.2 ± 12.4		72.4 ± 11.6		72.9 ± 12.1		0.576
Heart rate (bpm)	90.9 ± 17.8		84.9 ± 16.5		88.6 ± 17.6		0.004
Ejection fraction (%)	31.7 ± 6.09		45.82 ± 2.8		36.4 ± 8.5		< 0.001
Creatinine (μmol/L)	174.8 (103.8)		135.4 (90)		161.5 (100.4)		0.084
NT-proBNP (pg/mL)	10882.1 (5416)		6661.6 (2301)		9560.7 (4669)		0.005

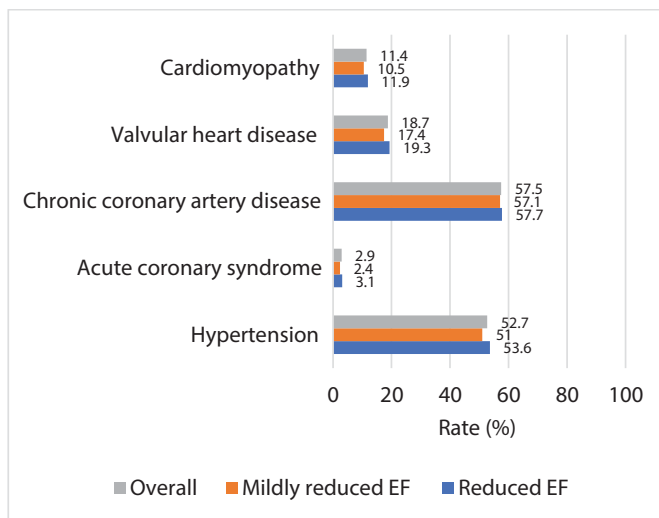


Figure 1. Causes of heart failure

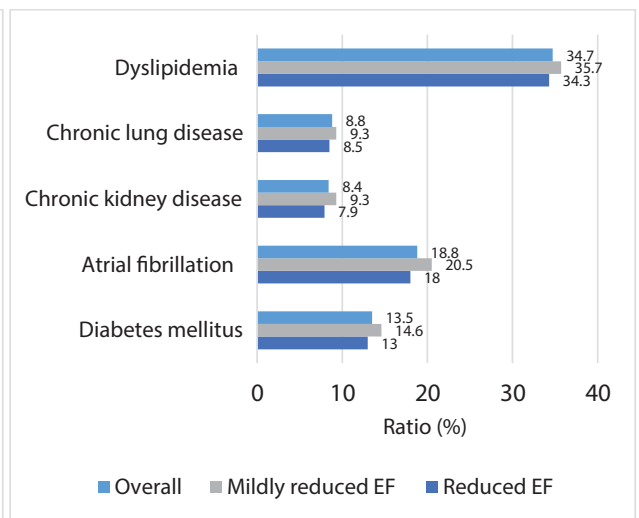


Figure 2. Comorbidities

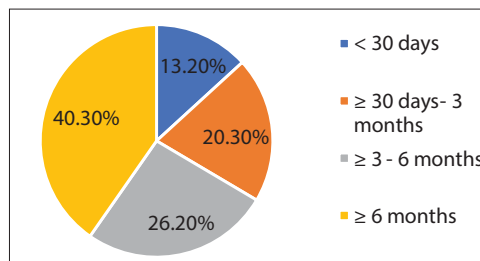


Figure 3. Patient statistics by follow-up time

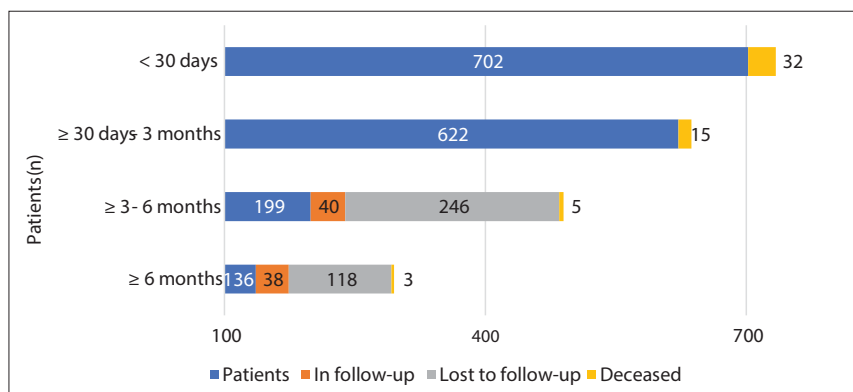


Figure 4. Patient follow-up statistics at different timepoints

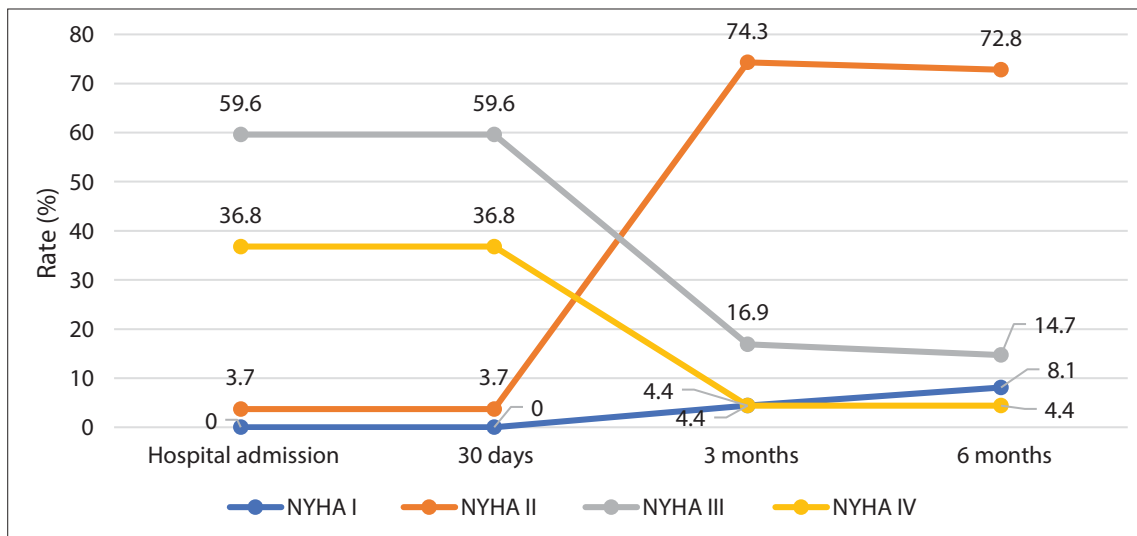


Figure 5. NYHA class distribution in ≥6 month group by stage

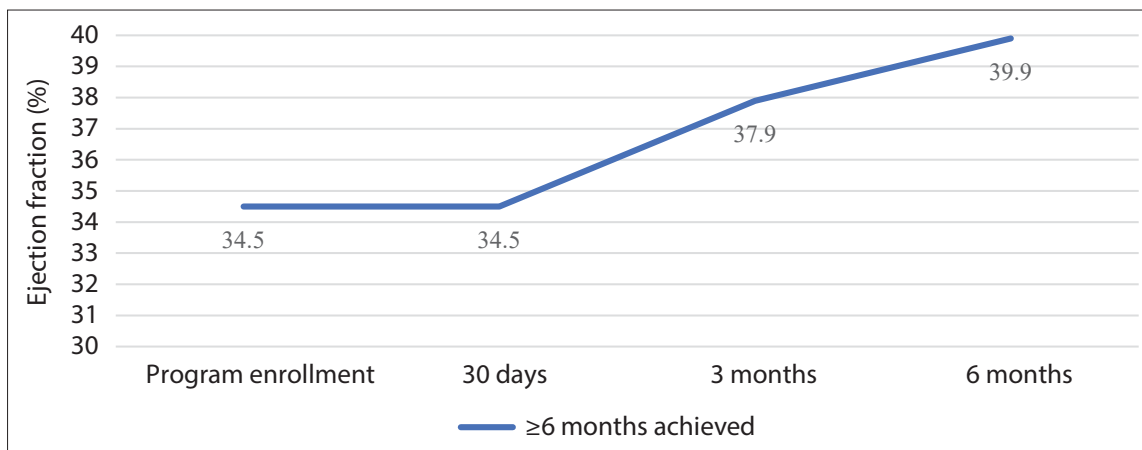


Figure 6. Ejection fraction by stage in ≥6 month group

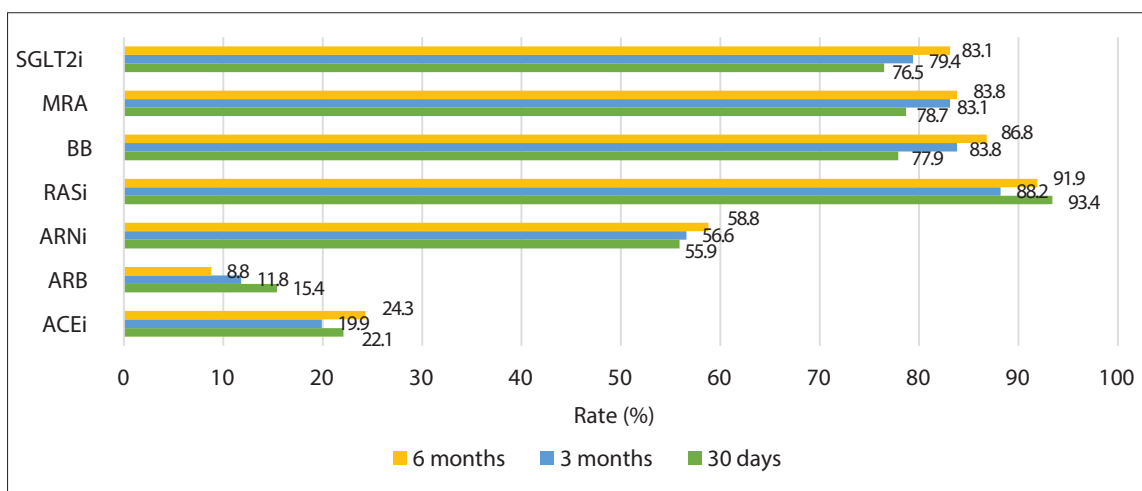


Figure 7. Medication usage rates in ≥6 month group

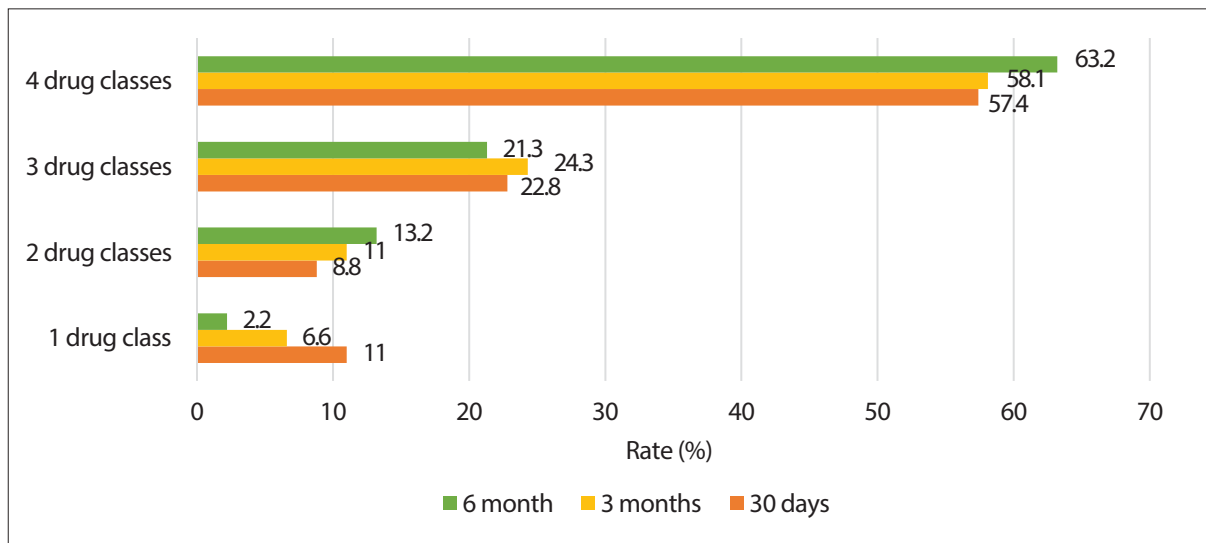


Figure 8. Proportion using number of drug classes in ≥6 month group

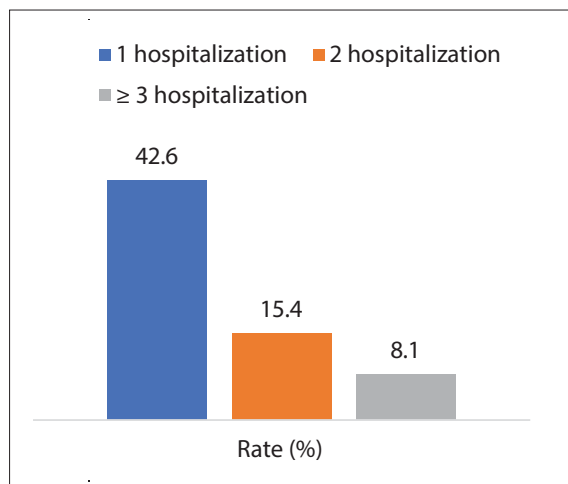


Figure 9. Heart failure rehospitalization rates in ≥6 month group

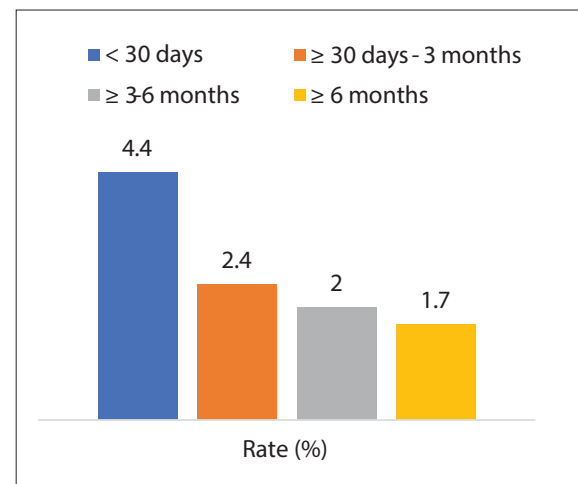


Figure 10. Overall mortality rates by stage

DISCUSSION

Clinical and paraclinical characteristics

The mean systolic blood pressure in our study was 122.9 ± 24.1 mmHg, lower compared to the EFICA study (126 ± 29 mmHg)¹⁶. High or low blood pressure compared to normal levels is also a factor considered in heart failure treatment and can affect prognosis.

At program enrollment, in the ≥6 month group, the initial EF was $34.5 \pm 6.9\%$. After 3 and 6 months of treatment, EF was $37.9 \pm 12.1\%$ and $39.9 \pm 11.9\%$ respectively, with statistically significant changes, compared to Vu Quynh Nga et al. where initial EF and

after 1 year follow-up were $37.93 \pm 8.58\%$ and $40.26 \pm 9.44\%$ respectively¹⁴.

The mean follow-up time in our study was 5.16 ± 3.53 months (maximum 14 months). In reality, good or poor treatment adherence depends on prescription of ACEi/ARB/ARNi, BB, MRA and SGLT2i¹.

Prescription rates of drug classes

The STRONG-HF study showed that early combination of all drug classes along with close monitoring and rapid up-titration over a short time was proven safe and helped improve patients' quality of life, as well as reduced rehospitalization and all-cause mortality rates⁹. Therefore, complete combination of all

4 drug classes from the beginning if no contraindications is necessary and beneficial for patients.

The TOPCAT study in patients with EF \geq 45% showed spironolactone reduced heart failure hospitalizations in the EF $<$ 55% group, while cardiovascular mortality was equivalent (not including all-cause mortality)¹³. The mineralocorticoid receptor antagonist prescription rate in our study was 78.7% initially, increasing to 83.8% after 6 months, higher than the THAI ADHERE study (17.1% and 12.5% respectively), and higher than Vu Quynh Nga et al. at 68.9%¹⁴.

Results from the PARADIGM-HF study showed the ARNi group was superior in reducing cardiovascular mortality and heart failure hospitalizations compared to ACEi⁸. Therefore, ARNi is preferred over ACEi and ARB. In our study, the proportion of patients taking ARNi at 30 days was 55.9%, much higher than ACEi (22.1%) and ARB (15.4%). After 6 months, ARNi prescription reached 58.8%, while only 8.8% and 24.3% of patients used ARB and ACEi. Additionally, overall ACEi/ARB/ARNi use at baseline was 93.4%, and 91.9% after 6 months, much higher than the THAI ADHERE study (25.7% and 28.1% respectively) and Vu Quynh Nga et al. at 86.52%^{10,14}.

The baseline beta-blocker prescription rate in our study was 77.9% in the \geq 6 month group, increasing to 86.8% after 6 months, higher than the THAI ADHERE study (26.1% and 24% respectively), the US ADHERE trial (56%; 64%) and EHFSII (43.2%; 61.4%)^{10,11}.

Data from the EMPEROR-Reduced and DAPA-HF studies demonstrate that SGLT2i are effective in improving symptoms and prognosis in heart failure patients with reduced and mildly reduced ejection fraction^{6,12}. The proportion of patients taking SGLT2i within 30 days in our study was 76.5%, increasing to 83.1% after 6 months. However, as these drugs are only partially covered by insurance and have high costs compared to average income, they are not easily accessible for most patients.

To achieve treatment goals in heart failure, treatment optimization is very important⁴. Compared to other studies like QUALIFY, a multinational study

of 6669 patients over 36 countries within 15 months post-discharge evaluating guideline-directed medical therapy adherence, results showed 22% of patients were not prescribed ACEi/ARB, beta-blockers, or MRA without any contraindications. Only 55% of patients achieved \geq 50% of target doses of ACEi/ARB and beta-blockers. Just 23% of reduced ejection fraction heart failure patients reached target doses of ACEi/ARB and beta-blockers³.

Heart failure rehospitalization and mortality rates and patient adherence

Earlier combination of more drug classes in heart failure treatment reduces mortality and rehospitalization compared to incomplete regimens¹⁵. For heart failure rehospitalizations, in our \geq 6 month group, the proportion with 1 hospitalization was 42.6%, decreasing to 15.4% for 2 hospitalizations, and 8.1% for \geq 3 hospitalizations. Our study also showed 57.4% of patients received complete combination of 4 drug classes within 30 days of enrollment, increasing to 63.2% after 6 months. Additionally, in our study, mortality rate was 4.4% in the $<$ 30 day group, declining over stages to 2.0% in the 3-6 month group, and only 1.7% in the \geq 6 month group, demonstrating the management program's effectiveness. Pooled data from 29 global clinical trials showed a 27% reduction in heart failure hospitalizations, 25% reduction in all-cause mortality with a multidisciplinary team-based heart failure program⁷.

Our study indicates the highest lost to follow-up rate was in the 3-6 month period, with 246 patients (50.2%). High loss to follow-up is due to patients returning to primary care without referral back to higher levels per insurance, low health awareness in patients, geographical barriers, etc. causing fragmentation after referral to outpatient management.

CONCLUSION

The optimal medication usage rate in heart failure treatment improved over time, mortality rates declined in each stage, however more management measures are needed to prevent patient loss to follow-up.

Lessons learned:

- The program succeeded in patient management, helping to optimize treatment as well as reducing mortality and rehospitalization rates after implementation.

- The management network should be expanded to provincial and district levels to avoid patient loss to follow-up and fragmentation.

- Promote education and training of healthcare staff in the program, enhance monitoring, supervision and experience learning during program implementation.

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