**Study Design**

**Title: Impact of Ejection Fraction Categories on Postoperative Outcomes in CABG Surgery: A Retrospective Analysis**

**Study Type**: Retrospective Cohort Study  
**Setting**: Shar hospital   
**Study Duration**: January 2021 to December 2023  
**Sample Size**: 194 patients

**Inclusion Criteria**:

* Patients who underwent CABG surgery.
* Documented pre-operative ejection fraction (EF) measured by echocardiography or other validated methods.

**Exclusion Criteria**:

* Patients without recorded ejection fraction data.

**Variables**

To analyze postoperative outcomes based on ejection fraction (EF) categories, we will categorize EF according to American Heart Association guidelines:

1. **EF > 50%** (Preserved EF)
2. **EF 41-49%** (Mildly Reduced EF)
3. **EF < 40%** (Severely Reduced EF)

**Preoperative Variables**

* **Demographics**: Age, gender, BMI.
* **Medical History**: History of chronic diseases (e.g., hypertension, diabetes, kidney disease, triple disease vessel, LAD vessel ).
* **Laboratory Tests**: Preoperative hemoglobin, renal function tests,
* **Ejection Fraction**: Grouped as specified above.

**Intraoperative Variables**

* **Type of CABG Surgery**: Off-pump vs. on-pump.
* **Number of Grafts**: Total number of coronary grafts performed.
* **Intraoperative Complications**: Bleeding, arrhythmias, or other complications.

**Postoperative Variables**

* **Primary Outcomes**:
  + **Postoperative Complications**: stroke, bleeding more than 1000ml without reoperation, reoperation, readmission to ICU, myocardial infarction, respiratory failure, renal failure.
  + **ICU and Hospital Length of Stay**: Duration of ICU stay, total hospital stay.
  + **Mortality**: In-hospital mortality rate.
* **Secondary Outcomes**:
  + **Blood Transfusion Requirements**: Units of blood products administered.
  + **Postoperative Laboratory Results**: Hemoglobin, renal.
  + **Functional Recovery**: Time to mobilization, discharge destination.

**Data Analysis**

1. **Descriptive Statistics**: Summary statistics for each EF group (mean, median, frequency).
2. **Comparative Analysis**:
   * Use Chi-Square or Fisher’s exact test for categorical variables.
   * Use T-test or ANOVA for continuous variables (if normally distributed).
   * Mann-Whitney U test or Kruskal-Wallis test for non-normally distributed continuous variables.
3. **Multivariate Regression Analysis**: Adjust for confounders to assess the independent effect of EF on postoperative outcomes.

**Ethical Considerations**

* Obtain approval from the institutional review board (IRB).
* Ensure patient confidentiality and anonymize data.
* Only use de-identified patient data and adhere to data protection regulations.