

# Incidence of Acute Renal Failure in Patients with Intracerebral Hemorrhage

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*Acute renal failure (ARF) is more common in patients with intracerebral hemorrhage (ICH) compared with the occurrence in other stroke subtypes.*

*There is limited information about the incidence of ARF either as a new-onset or in patients with chronic renal failure (CRF).*

*We examined the incidence of ARF in patients with primary diagnosis of ICH in our Neuro-ICU.*

## OBJECTIVES

- To evaluate the incidence of renal failure in patients admitted with intracerebral hemorrhage.
- To evaluate the clinical and demographic influences on the incidence of renal failure in intracerebral hemorrhage.

RIFLE and AKIN Classifications for AKI

**Table 1: Risk, Injury, Failure, Loss of Kidney Function and End-Stage Kidney Disease (RIFLE) Classification <sup>2</sup>**

Classification	GFR	UO
Risk	↑ SCr x 1.5 or ↓ GFR >25%	<0.5 mL/kg/h x 6 h
Injury	↑ SCr x 2 or ↓ GFR >50%	<0.5 mL/kg/h x 12 h
Failure	↑ SCr x 3 or ↓ GFR >75% or if baseline SCr ≥353.6 μmol/L (≥4 mg/dL) ↑ SCr >44.2 μmol/L (>0.5 mg/dL)	<0.3 mL/kg/h x 24 h or anuria x 12 h
Loss of kidney function	Complete loss of kidney function >4 weeks	
End-stage kidney disease	Complete loss of kidney function >3 months	

GFR, glomerular filtration rate; UO, urine output; SCr, serum creatinine.

## METHODS

We analyzed records of ICH patients admitted to a single academic Neuro ICU center between 2008 and 2012.

Demographics, past medical history and laboratory values were collected.

Patients were divided into groups of no previous history of renal failure (CRF) and history of renal failure and further divided using RIFLE classification for acute renal failure (ARF) as not qualified as ARF, risk of ARF and confirmed ARF either as injury or failure. (Table 1)

**Table 2: Study Population (N = 604)**

Demographics		
Age		44-87
Sex	Female	40.3%
	Male	59.7%
Race	Caucasian	32.8%
	Hispanics	13.4%
	African American	49.3%
	Other	4.5%

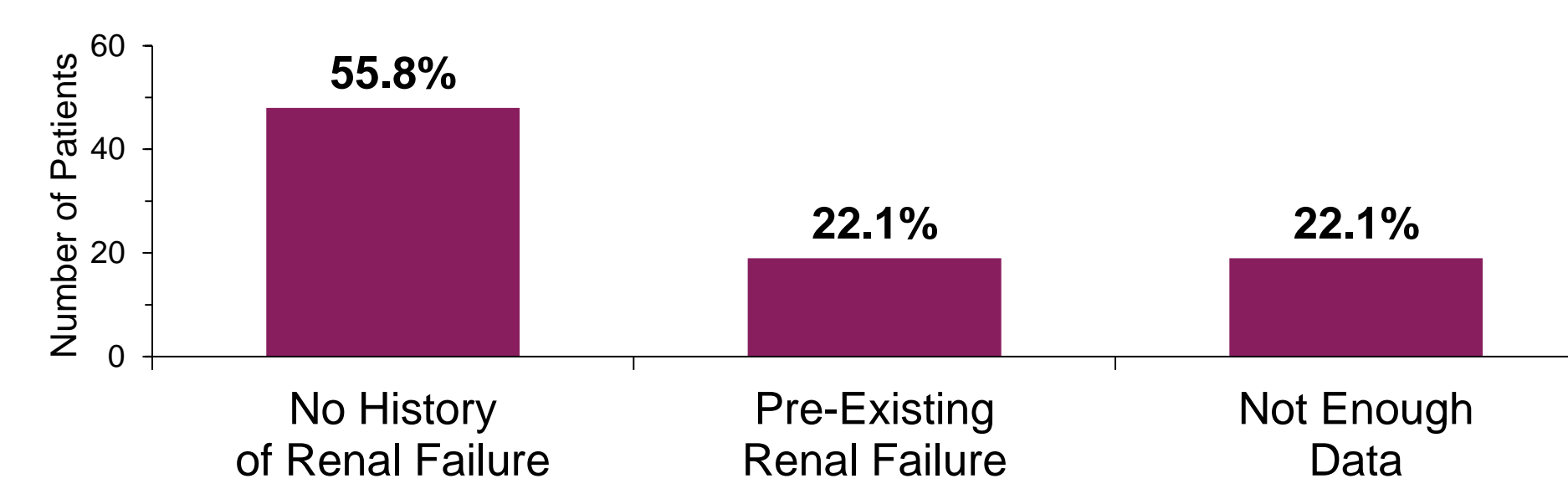
**Table 3: Incidence of ARF in ICH in Comparison to Other Studies**

Criteria	%	RIFLE Classification	With RF (%)	Without RF (%)
AKIN	21.0	No RF	73.7	68.8
ICD-9	6.8	Risk	10.5	16.4
		Injury	10.5	8.3
		Failure	5.3	4.5

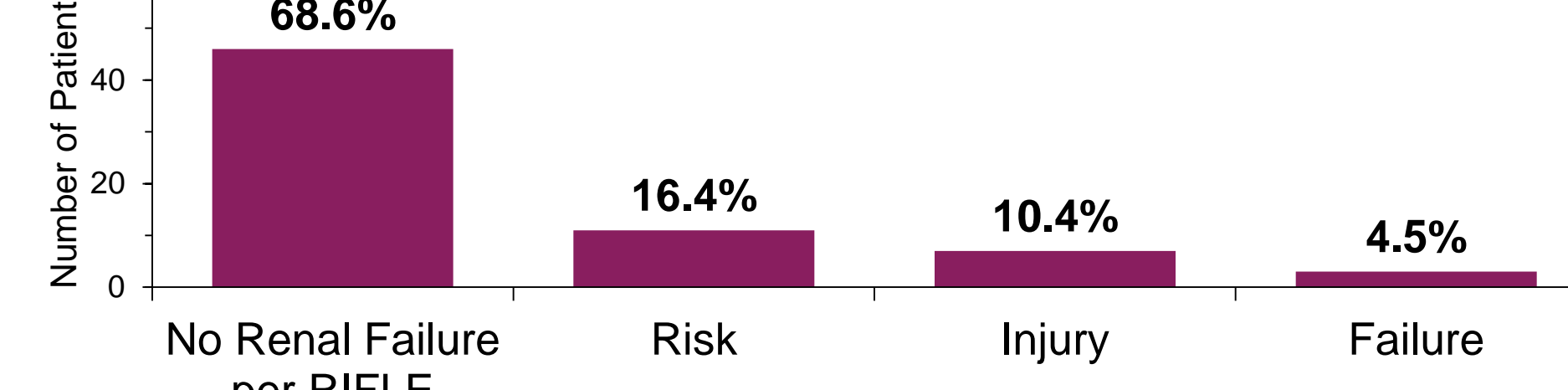
Zorrilla-Vaca et al. <sup>4</sup>

Our Study

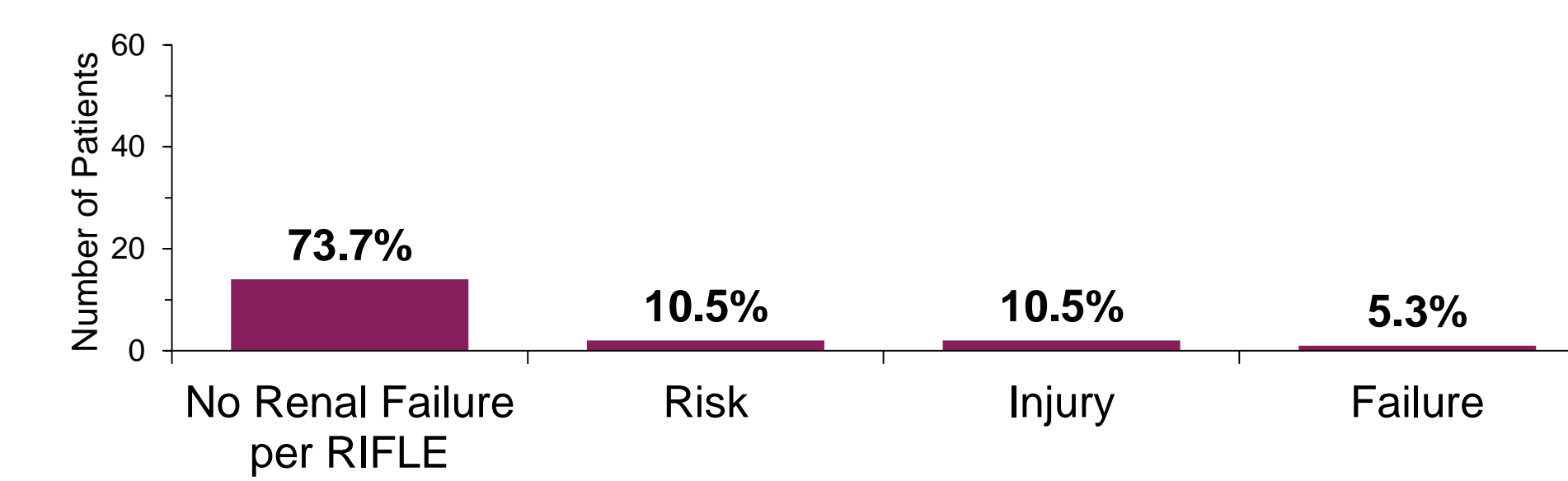
**Figure 1. Renal Failure Distribution (n = 86)**



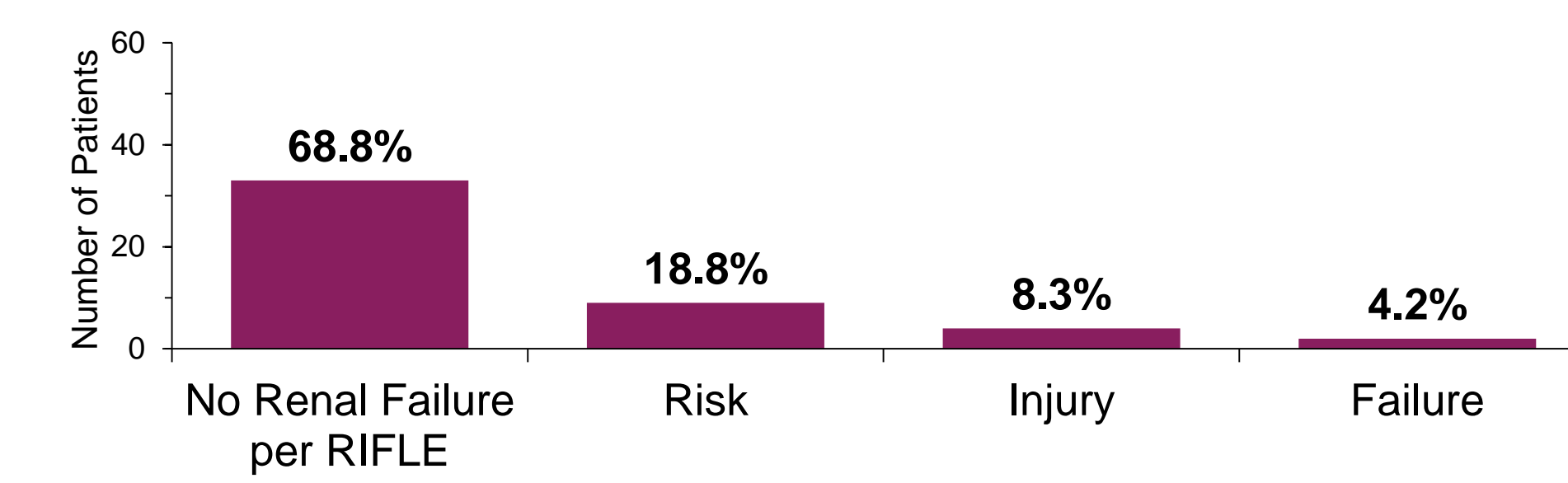
**Figure 2. Distribution of Renal Failure by RIFLE Classification (n = 67)**



**Figure 3. Pre-Existing Renal Failure (n = 19)**



**Figure 4. No Pre-Existing Renal Failure (n = 48)**



## RESULTS

604 patients with diagnosis of ICH were identified along with their demographic distribution. (Table 2)

86 (14.2%) concurrently had renal failure. Of this cohort:

- 19 (22.1%) had diagnosis of CRF,
- 48 (55.8%) were diagnosed with ARF
- 19 (22.1%) did not have enough data to support the classification. (Figure 1)

Using RIFLE criteria, 46 patients (68.6%) did not qualify as ARF, 11 (16.4%) were catalogued as risk and 10 patients (14.9%) were confirmed ARF either as injury or failure. (Figure 2)

## CONCLUSION

- Minimal occurrence of ARF in patients with ICH with or without pre-existing kidney disease.
- Standardization for ARF classification is required.
- A larger study may be required to support this statement.
- Other effects such as effect of ARF on mortality, influence of blood pressure regulation, length of stay, need for dialysis and functionality on discharge could be important markers to evaluate.

## REFERENCES

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