

Contents

	Introduction	12
	The Pathogenesis and Clinical Course of Cirrhosis	16
2.1.	Liver fibrosis	16
2.2.	Portal hypertension	17
2.3.	Liver cirrhosis and decompensation	17
2.4.	Diagnostic options	20
2.5.	Treatment options	21
	Properties of Endogenous Albumin in Cirrhosis	26
3.1.	Human albumin – synthesis, metabolism, structure and properties	26
3.1.1.	Albumin synthesis and metabolism	26
3.1.2.	Albumin structure	26
3.1.3.	Albumin functions	26
3.2.	Pathomechanisms and complications in cirrhosis	29
3.2.1.	Portal hypertension	29
3.2.2.	Acute decompensation and acute-on-chronic liver failure	30
3.3.	Serum albumin abnormalities in cirrhosis	31
3.3.1.	Hypoalbuminemia	31
3.3.2.	Albumin structure and function abnormalities in cirrhosis	31
3.3.3.	Effective albumin concentration	32
	Treatment Concepts and Established Indications	36
4.1.	Historical overview of indications for human albumin in cirrhosis	36
4.2.	Albumin use after large-volume paracentesis	36
4.2.1.	Large volume paracentesis and post-paracentesis circulatory dysfunction	36
4.2.2.	Albumin use for the prevention of PPCD after LVP	37
4.2.3.	Is there a role for albumin in paracentesis of less than 5 liters?	38
4.3.	Albumin use in patients with spontaneous bacterial peritonitis	38
4.3.1.	Prognostic significance of bacterial infections in cirrhosis	38
4.3.2.	Pathophysiology and the clinical course of spontaneous bacterial peritonitis	39
4.3.3.	Albumin use for prevention of acute kidney injury in patients with spontaneous bacterial peritonitis	39
4.3.4.	Do all patients with spontaneous bacterial peritonitis require albumin?	40
4.4.	Albumin for the management of patients with cirrhosis and acute kidney injury	40
4.4.1.	Redefining acute kidney injury in cirrhosis	40
4.4.2.	Use of albumin in the diagnostic work-up of AKI	42
4.4.3.	Albumin in the treatment of HRS-AKI	44
4.4.4.	Adverse events associated with albumin use in patients with AKI	44
	New indications for albumin in patients with decompensated cirrhosis	52
5.1.	Acute or short-term albumin administration	52
5.1.1.	Bacterial infections unrelated to SBP	53
5.1.2.	Sepsis with hypotension	54
5.1.3.	Hepatic encephalopathy	55
5.1.4.	Hyponatremia	56

5.1.5.	Acute decompensation of cirrhosis requiring hospitalization	57
5.1.6.	Considerations for acute and short-term albumin treatment	58
5.2.	Long-term use of albumin for the management of ascites	58
5.2.1.	The ANSWER study	58
5.2.2.	The “refractory ascites” study	60
5.2.3.	The MACHT study	60
5.2.4.	The “filling the gap” hypothesis	61
5.2.5.	Real-world experience	61
5.2.6.	Considerations for long-term albumin treatment	62

Role of Albumin Levels, Biomarkers and Treatment Monitoring 66

6.1.	Changes in quantity and quality of albumin in decompensated cirrhosis	66
6.2.	Treatment targets in acute and long-term settings	67
6.2.1.	Acute setting	67
6.2.2.	Long-term setting	69
6.3.	Future directions and conclusions	70

The Caveats of Albumin Use in Cirrhosis 74

7.1.	Volume expanding effects of albumin and the risk of volume overload	74
7.2.	Volume expanding effects of albumin and the risk for variceal hemorrhage	76
7.3.	Albumin effects on coagulation	78
7.4.	Allergic reaction to albumin	78
7.5.	Other possible side effects	81

Mechanisms of Albumin 86

8.1.	Mechanisms of action of albumin and pathophysiologic considerations in cirrhosis	86
8.2.	Oncotic pressure	86
8.3.	Antioxidant and binding abilities	87
8.4.	Endothelial stabilization and coagulation	87
8.5.	Anti-inflammatory	88

Future Directions 92

9.1.	Choose wisely	92
9.2.	Albumin levels and biomarkers for guidance	92
9.3.	Drugs bound to albumin	93
9.4.	Organization of services	93

Index 94