

TABLE OF CONTENTS – Equine Clinical Pathology

Contributors

Preface

1 General Laboratory Medicine 3

Raquel M. Walton

General laboratory medicine 3

Basic hematologic techniques 4

Point-of-care testing 6

Test validation and reference values 10

References 14

2 Equine Hematology 15

Raquel M. Walton

Complete blood count interpretation 15

Erythrocyte indices 15

Leukogram 20

Platelets 22

Blood film evaluation 23

Erythrocytes and platelets 25

Leukocytes 30

References 33

3 Immunohematology and Hemostasis 37

Karen V. Jackson

Immunohematology testing 39

Blood typing 39

Crossmatching 41

Antibody screening and jaundiced foal agglutination test 42

Immune-mediated hemolytic anemia 44

Neonatal isoerythrolysis 46

Infection-associated (Clostridial, EIA, R. equi, S. equi) 48

Drug-associated 50

Neoplasia-associated 50

Coagulation testing 51

Physiology of hemostasis 51

Coagulation testing and disorders causing abnormalities 60

References 66

4 The Liver 71

Dennis J. Meyer and Raquel M. Walton

Liver enzymes 71

Hepatocellular enzymes 73

Hepatobiliary enzymes 74

Liver function tests 76

Excretory function tests 76

Tests dependent on synthetic/metabolic functions 77

Other tests 79

Hepatic diseases 80

Toxins 80

Infections 82

Hepatic lipidosis 83

Serum hepatitis (Theiler's disease) 83

Hepatocellular neoplasia 84

References 84

5 Laboratory Evaluation of the Equine Renal System 87

Andrea A. Bohn

Laboratory assessment of the kidney 87

Glomerular filtration rate 89

Reabsorption and electrolyte regulation 90

Water conservation and blood volume regulation 91

Other renal functions 92

Urinalysis 92

Gross evaluation 92

Urine-specific gravity 92

Reagent test strips 94

Urine sediment exam 95

Laboratory abnormalities associated with different disease states 98

Acute renal failure 98

Chronic renal failure 98

Urinary tract rupture 99

“Early” renal disease 100

Strenuous exercise 101

References 101

6 Acid-Base and Electrolytes 103

Andrea A. Bohn

Acid-base 103

Steps to evaluating acid-base status 104

Bicarbonate 104

Metabolic acidosis and alkalosis 105

Respiratory acidosis and alkalosis 106

Compensatory mechanisms 106

Base excess 107

Electrolytes 107

Sodium 107

Chloride 109

Potassium 110

Calcium 112

Magnesium 114

Phosphate 115

References 116

7 Proteins 119

Koranda Wallace

Plasma proteins 119

Albumin 119

Globulin 120

Acute phase proteins 120

Protein disorders 124

Hypoalbuminemia with hypoglobulinemia 124

Hypoalbuminemia with normal or increased globulins 125

Hypoglobulinemia with normal to increased albumin 125

Hyperalbuminemia 126

Hyperalbuminemia and hyperglobulinemia 126

Hyperglobulinemia 126

Hyperfibrinogenemia 127

References 127

8 Laboratory Assessment of Lipid and Glucose Metabolism 131

Raquel M. Walton

Lipids 131

Triglyceride metabolism 132

Laboratory characterization of lipid metabolism 133

Equine hyperlipidemias 136

Glucose 138

Glucose metabolism 139

Insulin resistance 140

Laboratory characterization of glucose metabolism 140

Diseases associated with glucose metabolic defects 145

References 149

9 Skeletal Muscle 153

Allison Billings

Laboratory evaluation of equine muscle disorders 153

General causes of increased serum enzymes 153

Serum enzymes detecting muscle injury 154

Additional factors affecting CK and AST enzyme activity 158

Other markers detecting muscle injury 159

Equine muscle diseases 161

Immune-mediated myopathies 161

Infectious myopathies 163

Traumatic myopathies 165

Inherited or congenital myopathies 166

Toxic myopathies 169

Nutritional myopathies 171

Myopathies of unknown cause 171

Other myopathies 173

References 173

10 Endocrine Evaluation 181

Jill Beech

Testing for pituitary pars intermedia dysfunction (PPID) 181

Cortisol concentrations 182

Adrenocorticotropin (ACTH) concentration 184

Alpha-melanocyte-stimulating hormone (α -MSH) concentrations 186

ACTH and α -MSH concentration responses following thyrotropin releasing hormone (TRH) administration 186

Insulin concentrations 187

Testing thyroid function in horses 189

Thyroid dysfunction 189

Thyroid hormones 189

Extrathyroidal effects on thyroid hormones 190

Nonthyroidal illness syndrome 192

Thyroid hormone evaluation 192

Thyroid stimulating hormone (TSH) concentration 193

Thyrotropin releasing hormone (TRH) stimulation 194

TSH stimulation test 194

T3 suppression test 195

References 195

11 Fluid Analysis 203

Raquel M. Walton

Pleural and peritoneal fluid 203

Pathogenetic mechanisms of body cavity effusions 204

Body cavity fluid analysis 208

Biochemical evaluation 210

Cells and cell counts 212

Synovial fluid 218

Fluid analysis 219

Degenerative arthropathies 224

Inflammatory arthropathies 225

Eosinophilic synovitis 227

Hemarthrosis 227

References 229

12 Cytology of the Lower Respiratory Tract 233

Martina Piviani

Indications 233

Collection techniques 234

Bronchoalveolar lavage 234

Tracheal wash 234

Sample processing 235

Normal findings 236

Cellular elements 236

Acellular elements 239

Contaminants 240

Interpretation of cytologic patterns 241

Neutrophilic inflammation 241

Mixed neutrophilic and histiocytic inflammation 245

Eosinophilic and mastocytic inflammation 245

Hemosiderosis 246

Cellular atypia 248

References 249

13 Cerebrospinal Fluid 253

Andrea Siegel

Formation, circulation, absorption, and function 253

Collection 254

Laboratory analysis 254

Gross appearance 255

Protein concentration 256

Antibody titers 258

Cell counts 258

Glucose 260

Enzymes 260

Lactic acid 260

Polymerase chain reaction 261

Phenotyping 261

Cytological examination 261

Normal findings 262

Abnormal findings 263

CSF in specific diseases 264

Viral infections 264

Bacterial infections 265

Fungal infections 265

Parasitic infections 266

Other diseases 266

References 266

Index 271.