Professor Dr. med. Klaus F. Kopp

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Bicarbonate-Alkali-Polyuria (B.A.P.)

Prof. K. F. Kopp, II. Med. Klinik rechts der Isar TUM

INDICATION: Risk of Acute Renal Failure (ARF) (in separate Groups of Patients)

1. All patients, **Age over 60 Years**
2. Pre-existing **C**hronic **R**enal **F**ailure **(CRF): Creatinine ≥ 1.9 mg/dl**
3. All patients **with only one kidney (solitary or functional)**
4. Organ Transplantation e.g. **NTX: Cadaver and Live Donors and Recipients**
5. All patients **with Systemic Diseases, Diabetics, etc.**
6. **Nephrotoxins exogenous** e.g. Ethylene-glycole, Tetracarbonchloride, Herbicides, Mushrooms etc.
7. **Nephrotoxins endogenous** e.g. Sepsis, Hemolysis, Rhabdomyolysis, Hyperuricemia, Oxalosis etc.
8. **Electrolyte -Fluid -Acid -Base -Disorders** e. g. Dehydration, Diarrhea, Drains etc.
9. **Gravida: Rjsk of EPH, HELLP** or with pre-existing **Renal Insufficiency (CRF)**
10. **All Risks 1 through 8, Pre- Peri- Post- Op and Pre- Post- Interventions** using **i.a.**- or **i.v.**- Infusion of **Contrast - Media**
11. **All Risks 1 through 8**, Pre- Peri— Post- Intake or Administration of **Nephrotoxic Medications e.g. Antibiotics, Cytotoxic Agents and NSAID's**

EMERGENCY-PROCEDURE Intravenous:

1. **First! Blood-Gas-Analysis: Venous. —(Arterial** in case of Hypoxia and/or Hypercapnea)
2. **Over-Correction i.e. Elevation of the Blood-Bicarbonate-Level** by means of 100 ml-Portions of 1-Molar = 8.4%—$NaHCO_3$ via CVK to approx. **28 mMol/L ≈ BE +7**. After each 100-ml-Bolus of 8.4 %-$NaHCO_3$ Blood-Gas-Controls arterial (if indicated), or venous are **mandatory**!
   AIM: Blood-BE ≥ +7.0
   DEMAND of 8.4 % = l-Molar-$NaHCO_3$:
   FORMULA: 0.3 x B.W. (kg) x (BE + 7 - BE measured) = mMol or ml 1-Molar-$NaHCO_3$
3. **NA^+, K^+, Cl^-** must be titrated to **normal levels**, then a **Loop-Diuretic** is applied
4. **Loop-Diuretic-**Bolus: = **SERUM-CREATININE** [mg/dl] (**2; 3; 4;** etc.) **x 40 mg FUROSEMIDE**

RESULT: Alkali-Diuresis increases to **Alkali-Polyuria (B.A.P.)**
CAUTION: Cardio-Pulmonary Insufficiency, Hypoxia, Hypercapnea !: Indication for Ventilator ?!
CAUTION: Alkalosis of other origin e.g. Hypochloremia, Hyperammonemia etc.
CAVEAT: First correct! Then B.A.P.
Relative Contraindications: Metabolic and Respiratory Alkalosis e.g. Hypochloremia, Cardio-Pulmonary Insufficiency, Fluid Lung, Generalized Edema etc.

DEFINITION of B.A.P.:
Urine-pH ≈ 7.5 - 8.0 + Polyuria (Adults) ≥ 125 ml/h (= 3000 ml/24h)
LEADING PARAMETER: Urine-pH

NOTE: The Kidney-Bicarbonate-Threshold is variable. It depends on Volume, Potassium, Aldosterone etc. It may be as low as BE +1; +2 mMol/L. Therefore, Blood-Gas- and Urine-pH- Controls are repeatedly needed in order: a) To identify the lowest possible Blood-BE at which Urine-pH ≥ 7 is maintained; b) To prevent undesired systemic Alkalosis!

MAINTENANCE of B.A.P.: Days or Weeks until maximum possible Kidney function is restored. Loop-Diuretic per 24hrs (via perfusor); Dose identical Bolus-Dose for Start of B.A.P.

CONTROLS: Blood-Gases; Serum-Electrolytes daily, including Chloride!

URINE-Volumes: ml/h, /6 h, /12 h or /24 h, Fluid-Balance, Bodyweight if possible
URINE - pH : at least three times daily.
Optimum-pH = 7.5 - 8.0 Use Narrow-Range-pH- Indicator: pH ≈ 5.6 to 8.0
Fluids: 8.4% $NaHCO_3$ plus 0.9 % NaCl plus KCl, or Ringer's S., or 5 % Glucose, or Kopp's Solution; via i.v.-Pump. I.v.-Nutrition if necessary. Total Fluid-Volume according to desired Fluid-Balance. **Polyuria of Minimum 3 to 4000 ml/ 24h / 70 kg B.W.** is required to obtain adequate uremic Waste-Clearances and negative Fluid-Balance if required. In order to maintain normal Serum-Levels, Electrolytes may have to be substituted!
NOTE: Urine-Volumes of > **6000 ml / 24h** may have to be managed! Serum-Creatinine may still rise for 1 or 2 days; then decreases rapidly.

ORAL PROPHYLAXIS

BLOOD-GAS-ANALYSIS, IF POSSIBLE OR AVAILABLE: Venous or Arterial in case of Hypoxia and/or Hypercapnea.

Use gastric juice-resistant Natriumhydrogencarbonat 1-Gram tablets FRESENIUS MEDICAL CARE (Germany) or AlkaSeltzer Gold tablets or Sodium Bicarbonate powder dissolved in fluid (milk, etc.) until urine pH of > +7 is reached.

LEADING PARAMETER is Urine-pH > +7

If Creatinine is above 1.9 mg/dl, use the minimum amount of FUROSEMIDE to induce Polyuria. Avoid low blood NaCl levels !, e.g. Salt Depletion. Therefore, NO LOW-SALT DIET.

MAINTENANCE and CONTROLS of B.A.P.:

Continue until maximum possible Kidney function is attained. Diuretic Dose per 24 hrs. according to demand, e.g. for control of Hypertension.

CONTROLS: According to the clinical condition, e.g. Inpatient/Outpatient; Blond-Gases; Serum-Electrolytes including Chloride ! and Blood-Glucose in Diabetics.
URINE-Volumes: ml/h, /6 h, /12 h or /24 hrs, Fluid-Balance, Bodyweight
URINE-pH: at least three times daily. Use pH-Indicator: pH 5.6 to p.H. 8.0
Optimum pH = 7.5 - 8.0