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DR. TAUBER'S PROGRAM

JEFFERSON MEMORIAL HOSPITAL

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I. INTRODUCTION

A. PRIVILEGE TO BE INVITED TO PARTICIPATE IN PROGRAM OF DISTINGUISHED COLLEAGUES.

B. PRIVILEGED TO MODERATE 1ST PART OF PROGRAM.

C. MUCH OF WHAT WILL BE SAID WILL BE BY EXPERTS IN THE PRACTICAL APPLICATION OF MEDICINE AND SURGERY TO PATIENT PROBLEMS.

II. MY PLAN

A. DEANS OF MEDICAL SCHOOLS LEARN A BIT ABOUT MANY THINGS — BUT I DO NOT HAVE SAME EXPERTISE AS MY COLLEAGUES IN CLINICAL MANAGEMENT AT PRESENT.

B. WILL PRESENT HIGHLIGHTS OF THE ESSENTIALS OF CARE OF THE CRITICALLY ILL — LONG TIME INTEREST.

C. WILL COVER A) THE HIGHLIGHTS OF PROBLEMS OF TRAUMA, B) SOME PARTICULAR PROBLEMS IN AIRWAY MANAGEMENT, C) PROBLEMS IN CHILDREN, D) A FEW PROBLEMS IN THE DESPERATELY ILL CARDIAC PATIENT AND E) SOME PSYCHIATRIC ASPECTS OF THE CARE OF THE DYING PATIENT.

III. TRAUMA

A. BACKGROUND INFORMATION OF THE IMPORTANCE OF SEVERE INJURY.

1) ACCIDENTS AND INJURY ARE THE LEADING CAUSE OF DEATH IN THE AGE GROUP 1-37 YEARS, AND THE FOURTH LEADING CAUSE FOR ALL AGE GROUPS.

2) DISABLING INJURIES AFFECT APPROXIMATELY 5% OF THE ENTIRE POPULATION OF THIS COUNTRY. OF THE 225 MILLION PEOPLE IN THIS COUNTRY, AT LEAST 500,000 WILL HAVE PERMANENT DIABILITY FROM THEIR ACCIDENTS EACH YEAR.

3) DIRECT COSTS FOR ACCIDENTS ARE ESTIMATED AT BETWEEN \$16 AND \$20 BILLION A YEAR. THIS FIGURE HAS TO BE CONSERVATIVE BECAUSE IT DOES NOT INCLUDE LOSS OF PRODUCTIVE WORK TIME, FAMILY WELFARE, INSURANCE PREMIUMS OR FAMILY AND ECONOMIC DISLOCATIONS.

4) PHYSICIANS OF ALL SPECIALTIES MUST APPRECIATE THE CONCEPT THAT ROADSIDE ACCIDENTS OR MILITARY WOUNDS MAY AUTOMATICALLY PRODUCE A CRITICALLY ILL PATIENT, OFTEN UNRECOGNIZED, BECAUSE OF THE LACK OF FACILITIES, THE PANIC AND EXCITEMENT AND THE LACK OF ORGANIZED PREPARED SKILL TO DEAL WITH THE PROBLEM.

A. ASSESSMENT OF THE PROBLEM - THREE QUESTIONS MUST BE ASKED:

1. WHAT SHOULD BE DONE TO PRESERVE THE LIFE OF THE PATIENT?
2. WHAT CAN BE DONE TO MINIMIZE COMPLICATIONS DUE TO THE INJURIES?
3. WHAT CAN BE DONE TO REDUCE THE PAIN FROM WHICH THE PATIENT IS SUFFERING?

THE FIRST PRIORITY IS TO PRESERVE THE LIFE OF THE PATIENT AND TO MAKE A SEARCHING ASSESSMENT OF THE RESPIRATORY AND CARDIOVASCULAR FUNCTIONS. ONE TENDS TO CONCENTRATE TOO MUCH ON THE OBVIOUS SKELETAL OR VISCERAL INJURIES INSTEAD OF THESE TWO VITAL FUNCTIONS.

IN PRESERVING LIFE, THE FIRST ACTIONS ARE TO:

- A. INSURE A CLEAR AND SAFE AIRWAY - ALL PHYSICIANS MUST LEARN TO INTUBATE.
- B. TO ASSESS AND SUPPORT VENTILATION AND OXYGENATION IF NEEDED - BY THE BEST MEANS AVAILABLE - AMBULANCES (SURFACE AND AIR) MUST BE EQUIPPED WITH ARTIFICIAL AIRWAYS OF ALL TYPES AND EFFICIENT, SIMPLE VENTILATORS.
- C. TO DIAGNOSE AND TREAT A PNEUMOTHORAX AS EMERGENCY CARE.
- D. TO ARREST BLEEDING AND REPLACE BLOOD LOSS AS QUANTITATIVELY AND AS SOON AS POSSIBLE.

SIMPLICITY IS THE KEY TO EMERGENCY AND IMMEDIATE CARE. WHAT CAN BE DONE TO MINIMIZE COMPLICATIONS?

SEARCH FOR THE UNEXPECTED AND UNUSUAL. THEY ARE MORE FREQUENT THAN ONE THINKS. THE POSSIBILITY OF SPINAL OR HEAD INJURIES SHOULD ALWAYS BE CONSIDERED. SIMPLE IMMEDIATE CARE FOR LIMB INJURIES, CHEST INJURIES, AND ABDOMINAL INJURIES ARE NECESSARY TO ASSESS.

PAIN RELIEF - INSUFFICIENT THOUGHT HAS BEEN GIVEN TO MODERN ANALGESIC METHODS. MORPHINE OR SIMILAR DRUGS ARE USED TOO OFTEN AND THOUGHTLESSLY. SOME NEW APPROACHES SUGGEST THE POSSIBILITY OF USING A MIXTURE OF 50% NITROUS OXIDE IN OXYGEN AT THE SCENE OF AN ACCIDENT OR INJURY FOR ANALGESIA. IT IS AMAZINGLY EFFECTIVE IN THE SMALL NUMBER OF PATIENTS THAT IT HAS BEEN TRIED ON. IT CAN EVEN BE SELF-ADMINISTERED - AND IT PROVIDES AN ENRICHED OXYGEN ATMOSPHERE AND CAN BE USED WITH A VENTILATOR.

BLOOD LOSS AND OLIGEMIA - THE ASSESSMENT OF BLOOD LOSS OR OLIGEMIA QUANTITATIVELY IS EXTREMELY DIFFICULT AND REQUIRES MUCH EXPERIENCE - IN ADDITION TO THOSE CLINICAL SIGNS AND MEASUREMENTS COMMONLY MADE BY ALL OF US, THE COINCIDENCE OF A LOW CENTRAL VENOUS PRESSURE AND A LOW ARTERIAL PRESSURE ARE VERY IMPORTANT DIAGNOSTIC AIDS AND MAY BE USED AS A MONITORING DEVICE FOR CORRECTIVE REPLACEMENT OF BLOOD - THERE ARE THOSE WHO BELIEVE THIS EQUIPMENT SHOULD BE IN AMBULANCES - THEY USE THEM IN EMERGENCY ROOMS.

RISKS FOR ANESTHESIA ARE GREATLY INCREASED IN OLIGEMIA IN PROPORTION TO THE DEGREE OF BLOOD LOSS. EVERY MANEUVER OF ANESTHESIA, INCLUDING INDUCTION, INTUBATION AND OTHER PROCEDURES ARE CONSIDERABLY MORE RISKY IN THE PRESENCE OF UNREPLACED BLOOD LOSS SINCE MOST ANESTHETICS LOWER CARDIAC OUTPUT AND REDUCE PERIPHERAL RESISTANCE. IF IT IS POSSIBLE BLOOD LOSS SHOULD BE REPLACED TO AT LEAST 80% OF WHAT THE CLINICIAN CONSIDERS TO BE NORMAL.

THE EFFECTS OF ANESTHETIC AGENTS ARE GREATLY ENHANCED DURING SEVERE OLIGEMIA. THIS PROPERTY CAN BE EXPLOITED FOR THE BENEFIT OF THE PATIENT. FOR INSTANCE, NITROUS OXIDE APPEARS TO BECOME MORE POTENT IN A SEVERELY INJURED PATIENT. THE USE OF POTENT AGENTS MUST

BE GIVEN WITH VERY GREAT CARE AND CAUTIOUSLY. LOCAL ANESTHESIA HAS PROBLEMS — INADEQUATE ANESTHESIA AND THE NEGLECT OF THE RESPIRATORY SUPPORT THAT THE USE OF MORE POTENT AGENTS IN OXYGEN PERMITS.

IV. A FEW SPECIAL PROBLEMS IN THE MANAGEMENT OF THE AIRWAY IN THE ACUTELY ILL PATIENT.

A. THE USE OF AN ARTIFICIAL AIRWAY IN RESPIRATORY OBSTRUCTION.

CRITICALLY ILL PATIENTS WHO HAVE OBSTRUCTION ANYWHERE IN THE RESPIRATORY PASSAGES, REQUIRE IMMEDIATE CORRECTION, SINCE THE TOLERANCE FOR BOTH HYPOXIA AND HYPERCAPNIA IS VERY POOR IN MOST INDIVIDUALS AND THE TOLERANCE IS SHARPLY DIMINISHED IN EITHER ACUTE OR CHRONIC ILLNESS.

1. THE APPROPRIATE AIRWAY IS THE ONE TO USE THAT WILL EITHER PASS THROUGH THE OBSTRUCTION IN THE AIRWAY OR RELIEVE IT WHEN IT IS FOUND. AIRWAYS WHICH RANGE FROM THE USE OF THE SIMPLE PHARYNGEAL AIRWAY, TO THE MOST COMPLEX CAREFULLY CHOSEN POLYVINYL ESTER NASOTRACHEAL AIRWAY FOR THE PREMATURE INFANT WITH RESPIRATORY DISTRESS SYNDROME, MUST BE CONSIDERED. TIME IS TOO SHORT TO INDICATE THE SPECIFIC AIRWAYS FOR EACH LESION FOR THE PRINCIPLE IS ONE OF RELIEVING THE OBSTRUCTION, SKILL IN PLACEMENT AND THE SELECTION OF THE APPROPRIATE ONE FOR THE CONDITION AT HAND.

B. THE COMPLICATED AIRWAY PROBLEM IN THE PATIENT WHO IS ACUTELY INJURED. - IT IS WELL KNOWN THAT PATIENTS WHO DIFFER IN MANY

RESPECTS AS TO THEIR ILLNESSES AND/OR THEIR INJURIES CLEARLY BENEFIT BY THE USE OF A MECHANICAL AIRWAY THROUGH WHICH ARTIFICIAL VENTILATION OF VARYING TYPES MAY BE ADMINISTERED. IT IS NOT KNOWN COMPLETELY WHY THE SUPPORT OF VENTILATION IN THIS MANNER WITH AN ARTIFICIAL AIRWAY BENEFITS SO MANY PATIENTS WITH DIVERSE PROBLEMS. IN MY ESTIMATION, TWO OF THE IMPORTANT CONSIDERATIONS ARE THE RELIEF OF THE WORK OF BREATHING, WHICH IS ALWAYS INCREASED IN THE POSTOPERATIVE PATIENT, IN THE PATIENT

WITH FEVER, IN THE PATIENT WITH OBSTRUCTION TO THE AIRWAY, AND IN THE PATIENT IN WHOM ARTERIAL-VEINUS SHUNTING OCCURS. PULMONARY ARTERIAL-VEINUS SHUNTING IS AN EXTREMELY COMMON COMPLICATION IN THE SEVERELY INJURED PATIENT AND ITS PRECISE CAUSES ARE KNOWN EXCEPT FOR THE FACT THAT IN ALMOST ALL INSTANCES EITHER FOREIGN MATERIAL - ASPIRATED OR EXUDED WILL BE FOUND IN THE ALVEOLAR STRUCTURE. IT IS ALMOST AS THOUGH THE LUNG IS A VERY PRIMITIVE ORGAN AND IS EASILY DAMAGED IN THIS FASHION. WHAT HAPPENS IN THE FINAL ANALYSIS IS THAT BLOOD PASSES THROUGH THE LUNG WITHOUT BEING VENTILATED AND IS THE CAUSE FOR BOTH HYPOXIA AND HYPERCAPNIA.

THE DURATION AND NATURE OF MECHANICAL VENTILATION AND THE SUBSTANCES USED, OR THE CONCENTRATION OF OXYGEN USED, ARE MATTERS OF CLINICAL JUDGMENT, AND GENERALIZATIONS ARE IMPOSSIBLE BEYOND A CERTAIN POINT. THE GENERALIZATIONS THAT ARE POSSIBLE ARE THAT THE WORK OF BREATHING MUST BE REDUCED TO NORMAL, THE AIR MUST BE NEARLY 100% HUMIDIFIED, AND THE AIR MAY BE ENRICHED WITH OXYGEN TO AN EXTENT NOT TO EXCEED 40% IN THE INHALED ATMOSPHERE AND SOMETIMES LESS. THE PRECISE CONCENTRATION OF OXYGEN IS BEST MONITORED BY BLOOD GAS MEASUREMENTS WITH THE BREATHING OF ROOM AIR AND THE BREATHING OF 100% OXYGEN TO ASSESS THE DEGREE OF PULMONARY SHUNTING.

V. THE ACUTELY ILL CHILD - ALTHOUGH THERE ARE VERY SPECIAL CONSIDERATIONS IN CHILDREN AND INFANTS WHO ARE ACUTELY ILL, MY EXAMINATION OF A WIDE VARIETY OF CLINICAL PROBLEMS FROM A LARGE VARIETY OF CAUSES, SUGGEST TO ME THAT CERTAIN GENERALIZATIONS CAN BE MADE WHICH MAY BE OF VALUE TO PUT TOGETHER FOR YOU.

WHETHER THE PATIENT IS TO BE OPERATED UPON FOR THE CORRECTION OF CONGENITAL HEART DISEASE, CONGENITAL ANOMALIES OF THE GASTRO-INTESTINAL TRACT, ACUTE INJURY, OR HAS BEEN THE VICTIM OF A MEDICAL ILLNESS WHICH IS PARTICULARLY DISTURBING IN THE YOUNG INFANT, ALL LEND

THEMSELVES TO CERTAIN GENERALIZATIONS.

THE SERIOUSLY ILL INFANT HAS IN COMMON, REGARDLESS OF COLOR, CERTAIN METABOLIC PROBLEMS WHICH IF UNCORRECTED OR UNRECOGNIZED OR UNTHOUGHT OF CAN LEAD TO DISASTER AND DEATH. THESE PROBLEMS ARE HYPOGLYCEMIA, HYPOCALCEMIA, AND DEFICIENCIES IN THE CLOTTING MECHANISMS. IT IS WISE IN ALL INSTANCES TO MAKE MEASUREMENTS OF THE BLOOD SUGAR, THE SERUM CALCIUM, THE PLATELET COUNT, THE PROTHROMBIN TIME, THE CONCENTRATION OF THE IMPORTANT ELECTROLYTES, THE BLOOD UREA NITROGEN, AND THE ARTERIAL BLOOD GASES. DERRANGEMENTS IN ANY OF THESE PARAMETERS, REGARDLESS OF THE CAUSE OF THE SEVERE ILLNESS, CAN, IF UNCORRECTED, LEAD TO VERY RAPID DETERIORATION.

PARTICULAR ATTENTION MUST BE GIVEN TO CONTINUED RESPIRATORY SUPPORT AND CARE FOR THESE CHILDREN REGARDLESS OF DISEASE. IT MAKES LITTLE DIFFERENCE WHETHER THERE IS PREOPERATIVE INFECTION, OPERATIVE TRAUMA, OR PULMONARY VENOUS CONGESTION OR SEVERE ILLNESS FROM OTHER CAUSES. THESE SICK INFANTS HAVE LUNGS THAT ARE UNABLE TO FUNCTION NORMALLY.

THE CORRECTION OF THE PROBLEM IS VARIABLE IN THE HANDS OF DIFFERENT EXPERTS, BUT MOST PEOPLE THESE DAYS USE A NASOTRACHEAL TUBE WHICH IS PLACED AS SOON AS THE PROBLEMS ARE IDENTIFIED AND THE PATIENT IS MANAGED WITH EITHER CONTROLLED OR ASSISTED VENTILATION BY MOST PEOPLE WITH A VOLUME RESPIRATOR, WHICH IS THOUGHT BY MANY TO PREVENT RESPIRATORY ACIDOSIS AND PERHAPS EVEN THE CONTROL OF PULMONARY EDEMA, SO COMMON IN THESE VERY SICK INFANTS. NASOTRACHEAL INTUBATION HAS BEEN MAINTAINED BY VARIOUS PEOPLE FOR PERIODS WHICH RANGE FROM HOURS TO WEEKS. THE USE OF TRACHEOSTOMY HAS, IN GENERAL, BEEN LARGELY ABANDONED AS BEING UNNECESSARY AND PERHAPS CAUSING A HIGHER INCIDENCE OF POSTTRACHEOSTOMY TRACHEAL STENOSIS.

ALTHOUGH THERE ARE EXCEPTIONS BECAUSE OF THE SEVERITY OF THE ILLNESS, EVERY EFFORT SHOULD BE MADE TO MAINTAIN THE INSPIRED OXYGEN

CONCENTRATION BELOW 40% SINCE THE EVIDENCES OF OXYGEN INTOXICATION APPEAR DRAMATICALLY IF 60% OXYGEN OR MORE IS USED FOR A PERIOD IN EXCESS OF 24 HOURS. THE DAMAGE THAT IS SEEN IS A PERMANENT DAMAGE TO THE LINING OF THE ALVEOLI. THE BEST GUIDE TO THE USE OF OXYGEN AND MECHANICAL VENTILATION IS IN PERIODIC DETERMINATION OF THE ARTERIAL P02. MOST EXPERTS IN THIS FIELD HUMIDIFY THE INSPIRED GASES WITH WATER, WHICH IS USUALLY PRODUCED EITHER BY ULTRASONIC NEBULIZATION, OR ALTERNATIVELY BY THE BOMBARDMENT OF WATER PARTICLES TO A SIZE COMPATIBLE WITH A RAIN PHENOMENON IN WHICHEVER PART OF THE AIRWAY IS SELECTED. IN GENERAL THE SMALLER THE SIZE PARTICLE THE LOWER IN THE AIRWAY WILL ITS DEPOSITION OCCUR. IF THE PARTICLE SIZE IS SMALL ENOUGH, IT BECOMES EQUIVALENT TO AN INTRAVENOUS INFUSION WHICH COULD BE EXTREMELY DANGEROUS IN THESE SICK PATIENTS. EXPERTS DIFFER ON THE PRECISE PARTICLE SIZE, BUT THE IDEAL IS TO HAVE THE RAIN PHENOMENON OCCUR PROXIMAL TO THE ALVEOLI AND DISTAL TO THE LARYNX.

SUCTIONING OF THE TRACHEAL BRONCHIAL TREE AND THORACIC PHYSIOTHERAPY ARE BEGUN IMMEDIATELY AND MUST BE CONDUCTED UNDER STRICT ASCEPTIC PRECAUTIONS.

DURING THIS PERIOD OF TREATMENT, BECAUSE IT IS SO DIFFICULT TO MAKE PRECISE DIAGNOSES IN SEVERELY ILL INFANTS AND BECAUSE THEIR DETERIORATION IS EXTRAORDINARILY RAPID IF THINGS GO BADLY, IT IS NECESSARY TO MONITOR THE ELECTROCARDIOGRAM AND THE ARTERIAL AND CENTRAL VENOUS PRESSURE AND THE WEIGHT OF THE INFANT AS FREQUENTLY AS IS POSSIBLE.

OF UPMOST IMPORTANCE IN THE VERY YOUNG INFANTS WHO HAVE INCOMPLETE CONTROL OF BODY TEMPERATURE IS THE AVOIDANCE OF HEAT LOSS WHICH IS VERY EASY TO OCCUR IN THESE PATIENTS. THE CONSEQUENCE OF RAPID HEAT LOSS IS THE INCREASED DEMAND FOR OXYGEN AND INCREASED CARDIAC OUTPUT, WHICH THESE PATIENTS CANNOT BEAT AND DOES RESULT IN THEIR DEATH. ACCORDINGLY, THE YOUNG INFANT SHOULD BE KEPT IN A WARM ENVIRONMENT WITH RADIANT HEAT CONTROL TO MAINTAIN A NEUTRAL

TEMPERATURE SO THAT HE DOES NEITHER GAIN NOR LOSE. 98°F IS A REASONABLE COMPROMISE AMONG THE VARIOUS TEMPERATURES WHICH MAY BE SELECTED.

IT IS IMPORTANT TO RECOGNIZE THAT MICRO METHODS MUST BE USED FOR THE MEASUREMENTS OF ARTERIAL BLOOD GASES, AND RAPID CORRECTIONS FOR DISTURBANCES SHOULD BE MADE BY ADJUSTMENTS OF THE RESPIRATOR AND OCCASIONALLY BY THE INTRAVENOUS USE OF AN ALKALINIZING MATERIAL WHICH CAN BE SODIUM BICARBONATE IN MOST INSTANCES. THERE ARE THOSE WHO HAVE DEVELOPED A FORMULA WHICH I FEEL CAN BE RECOMMENDED TO THIS GROUP. IF ONE TAKES THE BODY WEIGHT IN KILOGRAMS, MULTIPLY IT BY 0.3 AND MULTIPLY THAT FIGURE BY THE BASE EXCESS AS DETERMINED BY THE ASTRUP TECHNIQUE AND DIVIDE IT BY 2, THE RESULT WILL SUGGEST THE NUMBER OF MEQ OF SODIUM BICARBONATE WHICH WILL CORRECT APPROXIMATELY HALF OF THE DEFICIT.

IF IT IS AT ALL POSSIBLE THE SODIUM INTAKE IN THESE SICK CHILDREN SHOULD BE LIMITED TO 2 MEQ PER KILOGRAM PER 24 HOURS DURING THE FIRST 48 HOURS. SOME OF THEM NEED POTASSIUM, AND THAT CAN ONLY BE DETERMINED BY MEASURING THE CONCENTRATION IN THE BLOOD AND ADJUSTING FOR A TOTAL ESTIMATED BLOOD VOLUME. A COMMON FIGURE OF POTASSIUM NEED, ESPECIALLY IN PATIENTS WHO ARE OPERATED ON FOR CONGENITAL HEART DISEASE, IS APPROXIMATELY TWICE THAT OF SODIUM PER UNIT OF TIME.

FOR THOSE WHO ARE UNABLE TO ESTABLISH AN INGROWING ARTERIAL LINE, ARTERIALIZED CAPILLARY SAMPLES CAN BE ANALYZED BY THE ASTRUP TECHNIQUE AS A REASONABLE APPROXIMATION.

THE FLUID INTAKE CAN BE ESTIMATED AT APPROXIMATELY 100cc PER KILOGRAM PER 24 HOURS. SOME REQUIRE SMALLER INTAKES, ESPECIALLY IF THEY HAVE CARDIAC FAILURE PROBLEMS. THE GUIDE TO ADJUSTMENTS IN FLUID INTAKE, WHICH OTHERS WILL SPEAK ABOUT IN MORE DETAIL, ARE URINARY OUTPUT, CHANGES IN URINE SPECIFIC GRAVITY, AND THE CLINICAL JUDGMENT OF EVENTS TAKING PLACE. THE SPECIFIC GRAVITY OF THE URINE CAN BE MEASURED VERY FREQUENTLY IF A REFRACTOMETER IS USED SINCE IT REQUIRES

ONLY ONE DROP OF URINE FOR THE STUDY. THIS INSTRUMENT IS MADE BY THE AMERICAN OPTICAL COMPANY.

NORMAL INSENSIBLE LOSS OF WATER IS ESTIMATED BY MANY PEOPLE AT 30CC PER KILOGRAM PER DAY. IF AN INFANT IS GIVEN 100 CC OF FLUID PER KILOGRAM PER DAY, ONE SHOULD EXPECT A URINARY OUTPUT OF 30CC PER KILOGRAM DURING THE FIRST 24 HOURS

FLUIDS ARE INCREASED WHEN URINE SPECIFIC GRAVITY IS HIGH AND THE INFANT'S CARDIAC STATUS IS STABLE. ADEQUATE HYDRATION MAY BE SAID TO EXIST WHEN THE URINARY OUTPUT OF 50 TO 60 CC PER KILOGRAM PER 24 HOURS, AND THE URINE SPECIFIC GRAVITY IS IN THE NEIGHBORHOOD OF 1.010.

A PRACTICAL MATTER IN THE CONTROL OF RESPIRATION IS THE NEED FOR SEDATION. SOME OF THE MORE SUCCESSFUL PEOPLE WHO MANAGE VERY SICK INFANTS USE MORPHINE IN DOSES OF 0.1 TO 0.2 MILLIGRAMS PER KILOGRAM EVERY 4 TO 6 HOURS

THERE ARE OBVIOUSLY OTHER PROBLEMS IN THE VERY SICK INFANT. THESE ARE GUIDES TO THE CLINICIAN WHO DOES NOT DEAL AS A SPECIALIST WITH THESE BABIES AND CHILDREN, AND YET SHOULD HAVE SOME GUIDES AS TO MANAGEMENT SHOULD HE BE IN A POSITION TO REQUIRE TO DO SO.

VI. A FEW PROBLEMS OF EMPHASIS IN THE VERY CRITICALLY ILL PATIENT WITH HEART DISEASE WHO IS FACED WITH A SURGICAL CONDITION OR WHERE THE POSSIBILITY OF SURGERY IS ENTERTAINED.

A. ANESTHESIA AND OPERATION ARE NOT RISKS IN THE NON-CRITICALLY ILL CARDIAC PATIENT AND NO MORE WILL BE SAID ABOUT IT IN THIS TALK SINCE WE DEAL ONLY WITH THE CRITICALLY ILL PERSON.

B. THE PATIENT WITH A RECENT MILD CARDIAC INFARCTION WHO FACES OPERATION IS EXPOSED TO A SIGNIFICANTLY HIGHER RISK OF BOTH INTRA-OPERATIVE OR POSTOPERATIVE MYOCARDIAL INFARCTION AND A HIGHER MORTALITY RATE. FOR EXAMPLE, IF A MYOCARDIAL INFARCTION OCCURS WITHIN THREE MONTHS OF THE TIME OPERATION IS INDICATED OR NEEDED, THE POSTOPERATIVE REINFARCTION RATE HAS BEEN ESTIMATED TO BE AS HIGH AS

40% WITH A MORTALITY RATE THAT RANGES FROM 35% TO 55%. IF THE TIME OF INFARCTION IS AS LONG AS SIX MONTHS PRIOR TO OPERATION, THE REINFARCTION RATE MAY BE 20% AND THE MORTALITY OF APPROXIMATELY 25%. BETWEEN SIX MONTHS AND TWO YEARS THE INCIDENCE OF REINFARCTION AND THE MORTALITY RATE PROGRESSIVELY DECREASE. SIMILARLY THE PATIENT WITH UNSTABLE OR INCREASING ANGINA PECTORIS HAS A RISK THAT IS TWO TO THREE TIMES THAT OF THE ONE TO TWO PERCENT SMALL RISK PRESENTED WITH THE PATIENT WHO HAS STABLE ANGINA PECTORIS.

FORTUNATELY MANY OF THE PRIMARY OR SECONDARY COMPLICATIONS OF SERIOUS HEART DISEASE CAN BE MANAGED SUCCESSFULLY IN THE CRITICALLY ILL PATIENT BY APPROPRIATE MONITORING, SOME PROPHYLACTIC MEASURES AND CAREFUL PREOPERATIVE PREPARATION OF THOSE COMPLICATIONS WHICH EXIST.

C. IF OPERATION IS INDICATED DURING A HYPERTENSIVE CRISIS, MANY EXPERTS CONTROL THE HYPERTENSIVE BY A MONITORED DRIP INTRAVENOUSLY OF AROUND 3 TO 4 MILLIGRAMS PER MINUTE. THE EFFECT IS RAPIDLY REVERSIBLE WHEN THE DRIP IS DISCONTINUED. SODIUM NITROPRUSSIDE IS ALSO RAPIDLY ACTING AND CAN BE ADMINISTERED INTRAVENOUSLY IN DOSE RANGES OF 0.5 TO 8.0 MICROGRAMS PER KILOGRAM PER MINUTE. OBVIOUSLY CONSTANT BLOOD PRESSURE MONITORING IS ABSOLUTELY ESSENTIAL SINCE THESE DRUGS ACT BY PERIPHERAL VASO-DILATATION AND THEREBY DECREASE THE AFTERLOAD AGAINST WHICH THE HEART MUST WORK AND OXYGEN DEMAND IS PROPORTIONATELY INCREASED.

D. CONGESTIVE HEART FAILURE - ATTENTION WILL BE PAID IN THIS DISCUSSION ONLY TO THOSE PATIENTS WITH DECOMPENSATED CONGESTIVE HEART FAILURE. VIGOROUS TREATMENT IS NEEDED IF SURGICAL INTERVENTION IS URGENT. DIGOXIN MAY BE ADMINISTERED INTRAVENOUSLY IF A PATIENT IS PREVIOUSLY NOT DIGITALIZED IN DOSES OF 0.5 MILLIGRAMS EVERY FEW HOURS UNTIL THE PATIENT BEGINS TO RESPOND CLINICALLY. THERE ARE THOSE WHO ALSO USE POTENT DIURETICS INTRAVENOUSLY IN THE CRITICAL SETTING WITH 40 MILLIGRAM INJECTION DOSES OF LASIX IN CONJUNCTION WITH THE PATTERN OF DIGITALIZATION,

WHICH WAS JUST DESCRIBED. THESE APPROACHES ARE INDICATED ONLY WHERE SURGERY IS ABSOLUTELY MANDATORY. OBVIOUSLY IF IT IS ELECTIVE OR NEARLY SO MORE TIME SHOULD BE REQUIRED TO PREPARE THE PATIENT PROPERLY AND ADEQUATELY.

E. ARRHYTHMIAS - MORE WILL BE SAID BY OTHERS ABOUT ARRHYTHMIAS, BUT IN THE CRITICALLY ILL PATIENT ELECTROCARDIOGRAPHIC MONITORING DURING AND AFTER OPERATION IS INDICATED. LIDOCAINE IS THE INITIAL DRUG OF CHOICE IN THE SETTING WE ARE DISCUSSING. INITIAL INJECTIONS INTRAVENOUSLY OF DOSES RANGING FROM 50 TO 100 MGM. FOLLOWED BY AN INTRAVENOUS INFUSION AT THE RATE OF 1-3 MGM. PER MINUTE IS A REASONABLE APPROACH. IF LIDOCAINE IS INEFFECTIVE IN CONTROLLING THESE VENTRICULAR ARRHYTHMIAS, QUINIDINE SULPHATE 200 - 300 MGM. MAY BE GIVEN EITHER ORALLY OR INTRAMUSCULARLY. QUINIDINE'S PROBLEM IS THAT IT TENDS TO DEPRESS CARDIAC FUNCTION AND BLOOD PRESSURE AND MUST BE USED WITH GREAT CAUTION ESPECIALLY WHEN GIVEN PARENTALLY. IF BOTH LIDOCAINE AND QUINIDINE FAIL, THERE ARE THOSE WHO USE PROCAINAMIDE 500 MGM. EVERY 6 HOURS OR DILANTIN 100 - 250 MGM. AS A FIRST DOSE AND REPEATED THREE TIMES A DAY.

F. IF THERE IS A BLOCK WITHIN THE SPECIALIZED CONDUCTING SYSTEM AND IF THE BLOCK IS COMPLETE A TEMPORARY TRANSVENOUS PACING WIRE PLACED IN THE APEX OF THE RIGHT VENTRICLE PRIOR TO SURGERY IS INDICATED IF THERE IS NO PERMANENT PACEMAKER. THIS INSTRUMENT CAN BE ATTACHED TO AN EXTERNAL DEMAND PACEMAKER UNIT WHICH WILL THEN BE AVAILABLE TO TAKE OVER PATIENT FUNCTION OF THE HEART, IF THE A-V JUNCTIONAL OR VENTRICULAR PACEMAKER FOCUS FAIL DURING THE OPERATION OR IN THE POST-OPERATIVE PERIOD.

THE AREA WHERE DEBATE CONTINUES IS WHETHER A PROPHYLACTIC TEMPORARY TRANSVENOUS PACING WIRE IS NEEDED IN PATIENTS WITH COMPLEX FORMS OF CONDUCTING SYSTEMS DISEASE. MY COLLEAGUES AT MY INSTITUTION FEEL THAT THERE ARE TWO SPECIFIC ABNORMALITIES

THAT SHOULD HAVE A TEMPORARY TRANSVENOUS PACING WIRE PLACED PRIOR TO OPERATION. THE FIRST IS THE INDIVIDUAL WHO HAS A COMPLETE RIGHT BUNDLE BRANCH BLOCK AND LEFT ANTERIOR HEMIBLOCK, I.E., ABNORMAL LEFT AXIS DEVIATION IN CONJUNCTION WITH PROLONGED PR INTERVAL. THE SECOND IS THE INDIVIDUAL WHO HAS COMPLETE RIGHT BUNDLE BRANCH BLOCK WITH AN ABNORMAL RIGHT AXIS DEVIATION, EVEN IF THE PR INTERVAL IS NOT PROLONGED. THIS ATTITUDE IS BASED UPON EXPERIENCE THAT COMPLETE HEART BLOCK USUALLY WILL OCCUR IN SUCH PATIENTS IF PREPARATION IS NOT DONE IN THE MANNER INDICATED.

G. IN INSTANCES OF HEMODYNAMIC INSTABILITY THE MORTALITY RATE CAN BE VERY HIGH IF THE PATIENTS ARE CRITICALLY ILL WITH SEVERE HEART DISEASE. THE BEST APPROACHES TO THESE PATIENTS AT PRESENT ARE CONSTANT MONITORING OF ARTERIAL PRESSURE WITH AN INTRA ARTERIAL LINE AND THE MONITORING OF PULMONARY ARTERY OR PULMONARY CAPILLARY WEDGE PRESSURE BY MEANS OF A SWAN-GANZ CATHETER. THIS APPROACH SEEMS TO BE BETTER THAN THE MEASUREMENT OF CENTRAL VENOUS PRESSURE ALONE.

H. MANY PATIENTS, ESPECIALLY ELDERLY ONES, MAY BE IN A STATE OF BORDERLINE HYPOVOLEMIA ON A CHRONIC BASIS. IF THEY BECOME ACUTELY ILL, ESPECIALLY SURGICALLY, THE SIGNIFICANCE OF THIS HYPOVOLEMIC STATE MAY INCREASE AND THEY MAY PRESENT THEMSELVES IN A PICTURE THAT LOOKS LIKE SHOCK. HOWEVER, THESE PATIENTS HAVE LOW CENTRAL VENOUS PRESSURE, LOW CARDIAC OUTPUT, AND DO IMPROVE WITH INCREASES IN BLOOD VOLUME. SMALL DOSES OF VOLUME EXPANDERS, INCLUDING DEXTROSE AND WATER, MAY BE BENEFICIAL IN THESE PATIENTS.

BY WAY OF CONTRAST IF THE PATIENT HAS IMPENDING CARDIOGENIC SHOCK, HE WILL HAVE A SIMILAR SYNDROME EXCEPT THAT THE PULMONARY ARTERIAL PRESSURE WILL BE HIGH AND RESPOND TO SMALL VOLUME CHALLENGES INTRAVENOUSLY, WITHOUT AN INCREASE IN CARDIAC OUTPUT. THESE PATIENTS ARE EXTREMELY DIFFICULT TO MANAGE AND CLINICAL JUDGMENT IS ESSENTIAL IN THE USE OF EITHER POSITIVE INOTROPIC AGENTS OR VOLUME EXPANDERS.

THERE HAS BEEN SOME SUCCESS WITH BOTH.

UNFORTUNATELY, THE MORTALITY IN THESE PATIENTS CAN RANGE AS HIGH AS 80 - 90% WITH EVEN TRIVIAL ERRORS IN MANAGEMENT.

VII. THE LAST SUBJECT I WISH TO DISCUSS, ONLY FROM ONE VERY SPECIALIZED AND TO THE BEST OF MY KNOWLEDGE, UNPUBLISHED MATERIAL, AND THIS IS SOME ASPECTS OF THE PSYCHIATRIC CARE OF THE DYING PATIENT.

ALL PHYSICIANS AND SURGEONS FACE PEOPLE WHO ARE DYING AND MANY OF THEM KNOW THAT THEY ARE.

MUCH HAS BEEN WRITTEN ON THIS SUBJECT AND IT IS NOT MY INTENTION NOR IS THERE TIME, TO EXPLORE ALL OF THE ASPECTS OF THE MANAGEMENT OF THE DYING PATIENT. I SHOULD SIMPLY LIKE TO REPORT SOME ASPECTS OF IT THAT MAY GIVE GUIDANCE TO THE PRACTITIONER IN THE MANAGEMENT BOTH OF THE PATIENT AND OF THE FAMILY WHO INEVITABLY SUFFER ENORMOUSLY DURING THIS PERIOD AND THIS PROCESS.

THERE HAVE BEEN STUDIES IN A SUBSTANTIAL NUMBER OF PATIENTS WHO ARE TERMINAL WITH MALIGNANT DISEASES IN WHICH THE BASIC HYPOTHESIS HAS BEEN THAT A HEIGHTENING OF CONSCIOUSNESS OF INNER LAYERS OF THE CENTRAL NERVOUS SYSTEM, OR THE PEELING AWAY, AS IT WERE, OF PATIENTS' NORMAL DEFENSES WITH THE USE OF PSYCHEDELIC DRUGS, HAS BEEN STUDIED. THE AUTHORS ARE THE GROF'S AND HALIFAX AND ONE AWAITS THE DETAILED OBSERVATIONS WITH INTEREST. THESE AUTHORS HAVE STUDIED PATIENTS PRIMARILY WITH THE USE OF LSD AND BELIEVE THEY HAVE DETERMINED THAT VERY PRIMITIVE AND VERY HEIGHTENED AWARENESSES OF CONSCIOUSNESS CAN BE EXPOSED WITH THESE DRUGS. THE ESSENTIAL FINDINGS ARE THAT THE DYING PATIENT, DURING THE ACTION OF THESE DRUGS, (WHICH INCIDENTALLY ALSO HAVE MAJOR SEDATIVE AND HYPNOTIC EFFECTS AS WELL AS EFFECTS ON HEIGHTENED CONSCIOUSNESS) PRODUCE MATERIAL WHICH SUGGESTS THAT SUCH PATIENTS HAVE ENORMOUS PROBLEMS WITH GUILT AND LESSER PROBLEMS WITH THE FEAR OF DISSOLUTION THAT COMES WITH DEATH. THE FAMILIES AND THE NEAREST OF KIN RESPOND TO THESE FEELINGS OF GUILT IN A VERY HEIGHTENED FASHION AND THE INTERPLAY BETWEEN PATIENT AND RELATIVES AND CLOSE

FRIENDS IS INTERESTING IN THAT THE MAJOR DEVELOPMENT ON BOTH SIDES OCCURS WITH A STRONG FEELING OF, ON THE ONE HAND, THE GUILT OF THE PARTING OF A LOVED ONE AND ON THE OTHER HAND THE ENORMOUS GUILT THAT THE NEAREST OF KIN FEEL ABOUT WHETHER THEY HAVE DONE ALL THAT IS POSSIBLE AND NECESSARY IN THE CARE OF THE DYING PATIENT. THESE AUTHORS HAVE GONE SO FAR AS TO RECOMMEND THE USE OF PSYCHEDELIC HEIGHTENING DRUGS RATHER THAN THE COMMON PRACTICE OF HEAVY SEDATION AND OBLITERATION OF CONSCIOUSNESS. IT IS THEIR CONVICTION THAT THE EXPOSURE OF THESE BILATERAL GUILTS IS OF HELP TO THE DYING PATIENT IN HIS DEATH THROES AS WELL AS TO THE RELATIVES IN THEIR BEING ABLE TO BOTH BEAR THE IMMEDIATE DEATH EXPERIENCE AND IN THEIR FEELINGS ABOUT THEMSELVES IN THE PERIOD THAT OCCURS AFTER DEATH. I RECOGNIZE THAT THIS MATERIAL IS BOTH NEW AND HIGHLY CONTROVERSIAL AND I DO NOT WISH TO HAVE MY REMARKS INTERPRETED AS ADVOCATING SUCH APPROACHES. I FEEL IT IS OF INTEREST AND PERHAPS MY RESPONSIBILITY TO BRING SOME FRESH AND NEWER APPROACHES TO YOU IN THIS VASTLY DIFFICULT AND OMNIPRESENT PROBLEM.

VIII. SUMMARY

I HAVE ATTEMPTED TO TOUCH ON THE HIGHLIGHTS OF THE MANAGEMENT OF THE CRITICALLY ILL PATIENT FROM THE STANDPOINT OF GENERALIZATIONS OF THE PROBLEMS, A SMALL NUMBER OF SPECIFIC SUGGESTIONS OF CERTAIN CLINICAL PROBLEMS AND THE PRESENTATION OF NEW AND HIGHLY CONTROVERSIAL MATERIAL IN SOME ASPECTS OF THIS DISCUSSION.

I HAVE DEALT WITH THE HIGHLIGHTS OF THE PROBLEMS OF ACCIDENTAL AND MILITARY TRAUMA, SOME PARTICULAR ASPECTS OF THE PROBLEMS OF AIRWAY MANAGEMENT, PROBLEMS IN THE MANAGEMENT OF THE ACUTELY ILL INFANT AND CHILD, SOME PROBLEMS AND SUGGESTIONS FOR SOLUTION FOR THE DESPERATELY ILL PATIENT WITH HEART DISEASE WHO FACES OPERATION, AND SOME NEW MATERIAL ON THE PSYCHIATRIC ASPECTS OF THE CARE OF THE DYING PATIENT WHO IS CERTAINLY CRITICALLY ILL.