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We request our esteemed readers to send their valued feedback, suggestions & views at ccciscmm@gmail.com

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ISCCM News Headlines

• Indicaps- first Indian epidemiological study on Indian ICUs - first data collection on 14th July - please participate
• ISCCM election are on - do participate - use your franchise.
• President, Dr Chawla gives impetus to growth and progress of ISCCM - forms new committees
• Accreditation of institutions for ISCCM course (IDCC and IFCC) on fast-track
• ISCCM extending cooperation with International societies - APCC after SCCM
• Dr Sunit Singhi does proud to ISCCM - completes 7 years as Asian representative in World Federation of Pediatric Intensive and Critical Care Societies (WFIPICS)
• Impressive growth of ISCCM membership continues
• Delhi getting ready for Criticare 2011
• Now you can pay online (Gateway) for membership of ISCCM and registration in Criticare 2011 - visit our website- www.isccm.org

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INDICAPS Study - First data collection on 14th July 2010

www.isccm.org

A BI-MONTHLY NEWSLETTER OF INDIAN SOCIETY OF CRITICAL CARE MEDICINE

Volume 5.3 • May-June, 2010
Dear Reader,

We thank you all for appreciating the first edition of The Critical Care Communications. Special thanks to the President Dr Rajesh Chawla for applauding the effort. I thank my editorial team for helping me in the endeavor. Our effort is focused towards connecting to branches and members of ISCCM as much as possible. We have got information from Nasik branch. The editorial board appreciates that. We are pleased to put the report in the bulletin with photos of branch leaders. We wish, we get similar activity reports from other branches.

The INDICAPS study is right there. This bulletin is dedicated to Indicap study. The first data collection has to take place on 14th July. I call upon you to participate whole heartedly in this study and contribute to creation of credible Indian data in Critical Care Medicine. Dr Divatia and his team has a challenging job on hand. Let us make it a grand success.

Thanks to Dr Kalpalatha Guntupalli – the India Born high profile dynamic President of American college of Chest Physicians for writing for The Critical Care Communications. I am sure it will inspire lot of us. We wish to publish similar write ups and messages from leaders in Critical Care Medicine across the world who have been associated with ISCCM over the years.

We are also publishing list of new members of the society enrolled during last quarter. We welcome them into ISCCM family. Please be an active member of the society and take it forward as its future Pilot. The president has expressed his intentions for aggressive growth of ISCCM by forming a number of new committees. I am sure this will decentralize the responsibilities and society will grow faster.

We have also started achievers column highlighting the achievements of our members in Critical Care Medicine particularly at International level. We invite reports from members about their achievements. Please attach documents copy and photos, if any.

I take this opportunity to invite comments, suggestions, letters including critical appraisal of the bulletin, its quality and contents. I also invite you to write articles for it. Small academic articles are also welcome. Please let us know how you like classic articles in critical care medicine from our archives. We have selected a few historical publications which gave impetus to further understanding and research in critical care medicine. After a long gap we have included a single page advertisement from Industry. We propose to spare one more page for such advertisement. I express my thanks to UCB for their participation. We are also starting situation vacant columns both in classified columns and as part of the page – the tariff has been published. This is based on suggestions and feedback for starting this column.

I thank Messers Urv’s Mr Trivedi and his team or printing the bulletin in stipulated design and time. Thanks Manish, Deepak and Kundan for always being there.

Thanks

Dr. Narendra Rungta
Editor, The Critical Care Communications and President-Elect ISCCM

"Achievers"
Dr. Sunit Singhi completes 7 years in WFIPICS

Dr. Sunit Singhi
sunit.singhi@gmail.com

Professor and Head, Department of Pediatrics, and Advanced Pediatrics Centre, Head, Pediatric Emergency and Intensive care, Post graduate Institute of Medical Education And Research, Chandigarh 160012, India.

WFIPICS activities
• ASIAN representative on Board of Directors of World Federation of Pediatric Intensive and Critical Care Societies since 2003
• Member International Executive Council, WFIPICS since June 2007
• ASSOCIATE EDITOR, Pediatric Critical Care Medicine since 2001; and Member, editorial board since 2001
• Participated in several Board meetings for planning global promotion of Ped Int Care, and 5th and 6th World Congress of Pediatric Intensive Care, Helped with grants for participants from developing countries at Congress
• Reviewer for abstracts submitted at World Congresses Geneva 2007, Florence 2009
• Successfully organized first Asian Congress of Pediatric Intensive Care in Sept 2009 under aegis of WFIPICS
It is said that “You can take a person out of India but you cannot take the families we take care of. We take care of illness and the feeling of helplessness imposed on the patients and the gratification of making a difference. As I accumulate years in age and enjoy the challenge of the acuity, urgency for immediate intervention and Critical Care Medicine, I have been in Critical Care all my life. Like you, I have traveled extensively in India, including major cities and remote places alike in the context of medical education. I have also had the privilege of speaking, conducting and attending many conferences all over the world. With this background, I feel I can make some educated guesses. The CrITICAl CaMMUNICATIoNS will be the chairperson of the executive Committee. To expedite and streamline the activities of the process we have separated the Education Section into two subsections. Prof. Dr. Chouhdary from Rohat Medical College would be the independent co-ordinator for accreditation section. Dr. Chari Janu has been entrusted with the responsibility of scouting for and selecting the new buildings for the ISCCM headquarters. We have already seen a few buildings and we hope to buy one by the year end.

Dr. Prakash Shastry and Dr. Rajhans will look after the Nursing Critical Care Section. Both of them are working very hard to start a new course for nurses called “Fundamental Nursing Critical Care Course”. A book on the same subject is being prepared and it will be released during CRITICARE 2011 in New Delhi. The Executive Committee has already approved this proposal. Dr. Narendra Rungta, President elect will be the chairperson of the Constitutional Committee and will make an attempt to simplify the constitution this year, which will come into force after its approval in the GBM.

As promised, the new website has already been launched and is very user friendly. I would personally like to thank Dr. Deepak, Dr. Sheila Myatra and Mr. Nitay Jani who have put in a lot of effort to make this venture possible. Please do visit www.isccm.org to see for yourself the good work they have done. We welcome your feedback in order to improve it further. Dr. Deepak Govil and Dr. Sheila Mytra will continue to look after the website and update it regularly.

We also need to update the ISCCM guidelines. Dr. P Bhattacharya, Chairman, Guidelines Committee is co-ordinating the process and we expect to complete it in the next six months.

In the last executive meeting we had taken a decision to celebrate Founders Day every year to create awareness about Critical Care Medicine. This year we plan to celebrate it after the Commonwealth Games to be held in October. Dr. Manish Munjal from Jaipur will be the National Co-ordinator for this program. We propose to hold the Basic Life Support course at more than 200 places all over India for doctors, paramedics and general public. I shall come back to you with all the details in the next issue.

This year we also propose to bring out a book, “Protocol and Guidelines-An ISCCM handbook”. Dr. Subash Todi has been entrusted with this responsibility.

I am busy organizing Criticare 2011. This year the 17th annual conference of Indian Society of Critical Care Medicine is being organized in association with the Ministry of Health and Family Welfare, Govt of Delhi. The conference is going to be of two days duration followed by two days of 16 workshops. We assure you that the conference will be very rich in its scientific content. We have formed a National Scientific Committee consisting of 15 members to finalize the programme. Please visit our website www.criticare.org for the latest update.

Friends, please come forward and be an active member of the society and contribute in its growth. Only with your participation and support can we grow faster.
New Committees Constituted by the President

BUILDING

CHAIRMAN Dr. C.K. Jani
MEMBERS Dr. J. Divatia • Dr. N. Rungta
Dr. Atul Kulkarni • Dr. Prasad Rajhans
Dr. Sheila Nainan Myatra

EDUCATION

CHAIRMAN Dr. Praveen Amin
EDUCATION COORDINATOR Dr. N. Ramakrishnan
ACCREDITATION COORDINATOR Dr. Dhruva Chaudhary
MEMBERS Dr. S. Todi • Dr. Shiva Iyer • Dr. Atul Kulkarni
Dr. Shyam Sunder • Dr. Krishan Chugh
Dr. Manish Munjal • Dr. Deepak Govil
Dr. Pradeep Bhattacharya

GUIDELINE

CHAIRMAN Dr. Pradeep Bhattacharya
MEMBERS Dr. Dhruv Chaudhary • Dr. Parveen Khilnani
Dr. G. C. Khilnani • Dr. Vijaya Patil
Dr. Prasad Rajhans • Dr. Shyam Sunder

CONSTITUTION

CHAIRMAN Dr. N. Rungta
MEMBERS Dr. Shirish Prayag • Dr. Deepak Govil
Dr. Praveen Khilnani • Dr. Manish Munjal

During 2010, the meetings held at ISCCM Nashik Branch are as follows:
1. February - Hepatic Encephalopathy in ICU By Dr Husain Bohari, Nashik
2. March - Thrombocytopenia in ICU By Dr Pritesh Junagade, Nashik
3. April - Complicated Malaria in ICU By Dr Ashit Bhagwati, Mumbai

ISCCM Activities – Nashik Branch

Welcome New Members to the ISCCM family

Dr. Suwarna Tambde
Secretary, ISCCM, Nashik Branch
isccmnashik@gmail.com

Dr. Atul Kulkarni
General Secretary, ISCCM
kaivalyaak@yahoo.co.in

MEMBERSHIP

CHAIRMAN Dr. Sheila Nainan Myatra
CO-CHAIR Dr. Palepu Gopal
MEMBERS Dr. Suninder S Arora • Dr. C. K. Jani
Dr. Y. P. Singh • Dr. S. Chandrashekheran
Dr. V. Parashar • Dr. Santosh Padhy

WEBSITE

Dr. Deepak Govil
Education, Annual Congress, News, Events,
City Branches of North, East & Central India

Dr. Sheila N Myatra
Membership, About ISCCM, Publications, Research
City Branches of South & West Region

RESEARCH

CHAIRMAN Dr. J. Divatia
MEMBERS Dr. Shirish Prayag

EXECUTIVE COMMITTEE - NASHIK BRANCH

CHAIRMAN Dr. Deodatta Chafekar
SECRETARY Dr. Suwarna Tambde
TREASURER Dr. Pankaj Rane
MEMBERS Dr. Yatindra Dube • Dr. Vijaya Ghatge
Dr. Shrish Deo • Dr. Suderashana Patil

1. Dr. Sushma Konduri L.M.-10/K/439
2. Dr. Cheruvu Rao L.M.-10/K/297
3. Dr. Ramkumar J L.M.-10/J/241
4. Dr. Dinesh Laiwani L.M.-10/L/42
5. Dr. Ajay V Venkatapathy L.M.-10/V/159
6. Dr. Paramesh Ayyappath A.L.M.-10/A/291
7. Dr. Deepak Chirmade L.M.-10/C/208
8. Dr. Mukesh Bang L.M.-10/B/340
9. Dr. Swastika Chand L.M.-10/C/209
10. Dr. Omprakash Sundrani L.M.-10/5/722
11. Dr. Yogesh Deogirikar L.M.-10/D/286
12. Dr. Shantanu Nandy L.M.-10/N/147
13. Dr. Shanti Prasad L.M.-10/P/404
14. Dr. Vivek Kute L.M.-10/K/440
15. Dr. Vivek Dave L.M.-10/D/287
16. Dr. Divyesh Patel L.M.-10/P/405
17. Dr. Monika Kothari L.M.-10/K/441
18. Dr. Dnyaneshwar Muktule L.M.-10/M/400
19. Dr. Shaik Shakeer L.M.-10/S/723
20. Dr. Safal Sable L.M.-10/S/724
C

children have a higher total body water component as compared to adults, and their fluid requirement depends on hydration status and disease state. Children have higher intake of water per kilogram compared to adults. Maintenance fluid is required in children who are euolemic and having no abnormal loss. Holliday-Segar method used since 1958 for estimating maintenance fluid in children may not hold true in all children. Practice of adding potassium should be added as per requirement since the rule of adding 20meq/l of potassium may not hold true in all children. Practice of adding potassium should be individualized depending upon the patient’s clinical condition and laboratory parameters. In small children all fluids including that used for preparing drugs and flushes should be taken into consideration. It is also important to know, that fluid is to be modified in active children as per disease states as shown in Table 2.

### Table 1: Calculation of fluid requirement in active and critically ill children

<table>
<thead>
<tr>
<th>Weight in Kg</th>
<th>Holliday-Segar in active children</th>
<th>Critically ill but not intubated</th>
<th>Critically ill but intubated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>1000ml/kg/d</td>
<td>50ml/kg/d</td>
<td>35ml/kg/d</td>
</tr>
<tr>
<td>12-20</td>
<td>1000ml + 50ml/kg/d</td>
<td>50ml + 30ml/kg/d</td>
<td>350ml + 20ml/kg/d</td>
</tr>
<tr>
<td>&gt;20</td>
<td>1500ml + 20ml/kg/d</td>
<td>800ml + 20ml/kg/d</td>
<td>550ml + 12.5ml/kg/d</td>
</tr>
</tbody>
</table>

### Table 2: Modification factor in different disease states

<table>
<thead>
<tr>
<th>Disease condition</th>
<th>Adjustment factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilated child during transport</td>
<td>0.7 x maintenance fluid</td>
</tr>
<tr>
<td>Hyperventilation</td>
<td>1.2 x maintenance fluid</td>
</tr>
<tr>
<td>Fever</td>
<td>Add 12% per centigrade above 38C</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>0.7 x maintenance</td>
</tr>
<tr>
<td>CHF</td>
<td>0.5-0.7 x maintenance fluid</td>
</tr>
<tr>
<td>SIAOD</td>
<td>0.5-0.7 x maintenance fluid</td>
</tr>
<tr>
<td>Renal failure</td>
<td>0.3 x maintenance fluid + urine output</td>
</tr>
<tr>
<td>High humidity</td>
<td>0.7 x maintenance fluid</td>
</tr>
<tr>
<td>Paralyzed</td>
<td>0.7 x maintenance fluid</td>
</tr>
<tr>
<td>Burns</td>
<td>4ml/kg/per % burn area on day one</td>
</tr>
</tbody>
</table>
The INDIgn Intensive care CAse mix and Practice patterns Study, or INDICAPS is now ready for launch.

INDICAPS is the first large scale, multicentre survey launched by ISCCM. The aim is to gather information about ICU’s, patients in ICUs, the types and severity of illness, monitoring and therapeutic modalities used, types of infections and other such data. We have no authentic, national data and this is our first attempt to generate such data. Over the past few months, members have registered their ICU’s for this study, and I am delighted that over 260 ICU’s have registered for this study.

This is a multi-center, all-India observational, one-day prevalence study, to be performed on four separate days. All patients that are to be present in the ICU on the second Wednesdays of July and October 2010 and January and April 2011 will be included in the study. The exact dates are July 14, 2010, October 13, 2010, January 12, 2011 and April 13, 2011. Data of all patients in the ICU will be collected for the 24 hours starting 08:00 am to 08:00 am next day.

You have to give data for all patients in the ICU on that particular day only. On the day of the study, you have to fill one ICU form for your ICU, and one patient form per patient that is in your ICU on that day. Sample forms are printed in this newsletter.

This cross-sectional design makes it easy to follow, and spares busy clinicians the effort of maintaining data daily throughout the ICU stay of every patient. We request you to spare time for us on that one day. This will generate powerful and important data on Indian Critical Care.

Those of you who have already registered, Thank You! You must have received a username and password for INDICAPS by SMS and email. In case you have not received your username and password as yet, please contact us on indicaps.isccm@yahoo.com. Please note that these login details are different from your ISCCM members’ login details and it will be provided only after you register for INDICAPS. Once you have your user id and password, follow the steps as mentioned below:

1. Go to the ISCCM website by clicking on http://isccm.org/Res_ISCCM_IndICAPS.aspx Log in using the given user ID and password. This will allow you to verify your ICU details, in case any changes have taken place since the time you registered. In particular, please make sure your mobile number and email id are correctly entered, and that you give the name, mobile number and email of an alternative contact person for this study.

2. The proforma, instructions, protocol and forms are displayed on the internet for you to download. You can use this to obtain approval from your hospital ethics committee. If your hospital does not have an ethics committee, please obtain approval from your hospital authorities (director or any other higher authority) to participate in this study. Please indicate if your hospital an Ethics Committee by ticking the appropriate box when you verify your ICU details at first login.

3. In the next couple of weeks, the database will be open for you to practice data entry. You will receive an SMS and email when this is ready.

In case you have not yet registered your ICU, please do so as soon as possible. Go to the link below, fill in the details and save the form http://isccm.org/InstitutionRegistration.aspx

This study will also pose formidable challenges. The biggest one is to communicate effectively with so many investigators. Hopefully, with modern technology, such as SMS, email and internet, as well as traditional methods including this newsletter, we will reach out to maximum members. A country like India has a wide diversity of types of ICUs, patients and practices, and it is this diversity that we wish to capture. So whether your ICU is large or small, 5-star hospital or 5-bed nursing home, urban or rural, full or empty, overstuffed or under-staffed, surgical or medical or cardiac or neuro, do not hesitate to join this study.

Our diversity is our biggest challenge, but it also makes the entire study fascinating and worth doing.

Lastly, the success of this venture finally depends on YOUR EFFORT. Our initial enthusiasm must now be backed by disciplined and honest reporting of data. We depend on you to fill in the data for your ICU and your patients, accurately, consistently and in a timely fashion. If you are able to sacrifice a little time and devote it to this study on one particular day, you can definitely do it. Successful completion of the study will silence skeptics, even amongst us, who doubt our ability to generate authentic information. We will have data for ourselves, and we can and will prove to the world that India can take on a huge challenge, and succeed.

Remember, Register for INDICAPS.

First data collection date is July 14, 2010

Dr. J.V. Divatia
Research Co-ordinator and Past President, ISCCM
### Indian ICU Case Mix and Practice Patterns Study (INDICAPS)

#### FORM 1 - ICU FORM - (One form for the ICU on the Study Day)

<table>
<thead>
<tr>
<th>Facilities available in ICU/Hospital</th>
<th>CRRT</th>
<th>Ultrasonography</th>
<th>MRI</th>
<th>24-hr Laboratory</th>
<th>Blood Gas Analysis</th>
<th>Chest X-ray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemodialysis</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ECHO</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT Scan</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defibrillator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microbiology Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fibreoptic Bronchoscope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac Cath Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Number of ICU Consultants

- Full time
- Only Enter Number.
- Part time
- Only Enter Number.

#### In the ICU at 12:00 pm (noon) on the study day:

1. How many beds are occupied?
2. How many beds are not occupied?
3. How many patients are ventilated?
4. How many patients have head elevation of 30-45 degrees?
5. How many nurses are present in the ICU?
6. How many ICU doctors (only consultants and residents, not visiting consultants/residents) are present in the ICU?
7. How many patients have an arterial line?
8. How many patients have a central venous line?
9. How many patients have a cardiac output monitoring device attached? (e.g., PA catheter, PICCO, Flotrac, etc.)
10. How many patients are receiving or scheduled for renal replacement therapy?
11. How many patients are being enterally fed?
12. How many patients are receiving thromboprophylaxis?
13. How many patients are receiving intravenous sedation?
14. How many patients are receiving stress ulcer prophylaxis?
15. How many patients are receiving intravenous antibiotics?
16. How many patients are having physical restraints?

#### In these 24 hrs (08:00 am today to 08:00 am next day):

- Admissions
- Discharges from the unit
- Deaths
Indian ICU Case Mix and Practice Patterns Study (INDICAPS)

FORM 2 - INDIVIDUAL PATIENT FORM

(One form for each patient in the ICU on the study day)

ISCCM Center No...............................................................

Patient No. ..............................................................................

Date of data collection ......................................../............./ 2010
Date of ICU admission ......................................../............./ 2010 Date of hospital admission ......................................../............./ 2010
Age ................................yrs  Sex:  Male  Female  Weight: .................................. Kg  Height ........................................ cm

Type of admission:  Medical  Surgical (Directly from OT/Recovery)  Trauma

Elective  Emergency Site / Type of Surgery ....................................  Trauma

Is this patient  self paying  payment by employer  private health insurance

Admission source:  Home  Ward of same hospital  Casualty / Emergency Department  Ward of other hospital

ICU of other hospital  Others, please specify ................................................

From same city/ town  From other city /town  If from other town, distance from your ICU .................... kms

Reason for ICU admission (Tick all that apply)

Basic & observational  Cardiovascular  Digestive  Hematological  Hepatic  Metabolic  Neurological  Poisoning

Renal  Respiratory  Trauma  Other

Did this patient have a cardiac arrest before he was admitted to the ICU?  Yes  NO

Diagnostic code (Use SINGLE best diagnostic code from APPENDIX 1) .................................................................

Comorbidities  COPD  Cancer Therapy  Metastatic cancer  Hematologic cancer  Insulin dependent diabetes mellitus

Heart failure (NYHA III)  Heart failure (NYHA IV)  Chronic renal failure  HIV infection Cirrhosis

AIDS  Immuno-suppression  Steroid therapy

Was the patient admitted to ICU with suspected / confirmed infection?  Yes  NO

If infection suspected / confirmed, was it (tick all that apply)

Malaria  Leptospirosis  Dengue fever  Scrub typhus  Bacterial  H1NI  Other Viral  Fungal  Other

Does the patient have suspected / confirmed infection today?  Yes  NO

Malaria  Leptospirosis  Dengue fever  Scrub typhus  Bacterial  H1NI  Other Viral  Fungal  Other

Was any sample sent to microbiology for culture / sensitivity?  Yes  NO

Did the infection develop in ICU?  Yes  NO

If infection was confirmed (Enter micro-organism codes as per APPENDIX 2)

Microorganism 1 ........................................  2 ............  3 ............  4 ............

What antibiotics is the patient receiving today (Enter antibiotic code as per APPENDIX 3)

1 ............  2 ............  3 ............  4 ............

Is the patient receiving anti-malarials today?  Yes  NO

If yes, is he getting  Quinine  Artesunate  Chloroquine

At any time during ICU stay did the patient have

Severe Sepsis  YES  NO  Septic Shock  YES  NO  Low dose steroids (for septic shock)  YES  NO

Activated Protein C  YES  NO

Did this patient come to the ICU after poisoning?  YES  NO. If yes

Organo-phosphorus poisoning  Organo-chlorine poisoning  Aluminium phosphate poisoning  Rat poisoning  Sedative overdose

Tricylic antidepressant overdose  Heroin / Cocaine or recreational drug overdose  Unknown  Other, please specify

Fluids for Resuscitation: In these 24 hours (08:00 am today to 08:00 am next day)

Has this patient received

Normal Saline or Ringer Lactate at rate equal to or greater than 500 mL/Hr

Hemaccel  Gelofusine  Any starch solutions (e.g. Voluven, Hextar, Haes-sriter, etc)

Whole Blood / packed cells Fresh Frozen Plasma  Platelets  Albumin

Hemodynamic Monitoring: In these 24 hours (08:00 am today to 08:00 am next day), did this patient have

Hourly urine output monitoring (measured every hour)  YES  NO

Invasive Arterial Blood Pressure  YES  NO  If yes Site Code (as per APPENDIX 4) ...........................................................

Central Venous Pressure  YES  NO  If yes Site Code (as per APPENDIX 4) ...........................................................

Cardiac Output Monitoring  YES  NO  If yes Monitor type Code (as per APPENDIX 4) ...........................................................

Intra-aortic Balloon Pump  YES  NO

A Bi-Monthly Newsletter of Indian Society of Critical Care Medicine

THE CRITICAL CARE COMMUNICATIONS
ISCCM Center No. ..........................................................  Patient No. ..........................................................  

Fill in the following details for this patient today (only fill if done on that day)  

**Cardiovascular system**  
Lactate (max) _ _ _ mmol/L  
Was Central Venous Oxygen Saturation measured?  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, (min)</td>
<td>_ _ _</td>
<td>_ _ _</td>
</tr>
<tr>
<td>(max)</td>
<td>_ _ _</td>
<td>_ _ _</td>
</tr>
</tbody>
</table>

Was Stroke Volume Variation measured?  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, (min)</td>
<td>_ _ _</td>
<td>_ _ _</td>
</tr>
<tr>
<td>(max)</td>
<td>_ _ _</td>
<td>_ _ _</td>
</tr>
</tbody>
</table>

**Noradrenaline**  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, dose (max)</td>
<td>_ _ _ μg/kg/min</td>
<td>_ _ _ μg/kg/min</td>
</tr>
</tbody>
</table>

**Dopamine**  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, dose (max)</td>
<td>_ _ _ μg/kg/min</td>
<td>_ _ _ μg/kg/min</td>
</tr>
</tbody>
</table>

**Adrenaline**  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, dose (max)</td>
<td>_ _ _ μg/kg/min</td>
<td>_ _ _ μg/kg/min</td>
</tr>
</tbody>
</table>

**Dobutamine**  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, dose (max)</td>
<td>_ _ _ μg/kg/min</td>
<td>_ _ _ μg/kg/min</td>
</tr>
</tbody>
</table>

**Physiological Parameters and Investigations**  

**Systolic blood pressure (min) _ _ _ mmHg**  
**Mean arterial pressure (min) _ _ _ mmHg**  
**Diastolic blood pressure (min) _ _ _ mmHg**  
**Respiratory rate (min) _ _ _ /min**  
**Total bilirubin (max) _ _ _ mg/dL**  
**Serum bicarbonate (min) _ _ _ mmol/L**  
**Serum potassium (min) _ _ _ mmol/L**  
**Serum sodium (min) _ _ _ mmol/L**  
**Leukocytes (min) _ _ _ /mm^3**  
**Platelets (min) _ _ _ /mm^3**  
**Hemoglobin _ _ _ g/dL**  
**INr (worst) _ _ _**  
**PT (worst) _ _ _ secs**  
**Urine output _ _ _ mL/24 hours**  
**Hemodialysis Yes  No**  
**CrrT Yes  No**  
**Blood urea _ _ _ mg/dL**  
**Sr. creatinine _ _ _ mg/dL**  
**Glasgow Coma Score (worst) Eye opening _ (1-4) Motor response _ (1-6) Total _ _ _**  
**Diastolic blood pressure (min) _ _ _ mmHg**  
**Core body temperature (min) _ _ _ °C**  
**Heart rate (min) _ _ _ /min**  
**Respiratory rate (min) _ _ _ /min**  

**Respiratory system**  
Mechanical ventilation  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Invasive Ventilation</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**If the patient is ventilated, reason for ventilation is**  

<table>
<thead>
<tr>
<th></th>
<th>OP Poisoning</th>
<th>Snake bite</th>
<th>GB syndrome or other Neuro-muscular disease</th>
<th>Major Trauma or Surgery</th>
<th>COPD</th>
<th>Pneumonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARDS</td>
<td>Cardiac failure</td>
<td>Severe sepsis</td>
<td>Other Please specify</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Endotracheal intubation Yes  No**  
**If yes, Route Oral  Nasal**  
**Tracheostomy Yes  No**  
**If yes, Surgical  Percutaneous**

**At 12:00 pm (noon), what were the ventilator settings?**  

<table>
<thead>
<tr>
<th></th>
<th>Mode of MV being used</th>
<th>Pressure control</th>
<th>Volume control</th>
<th>CMV</th>
<th>Assist control</th>
<th>SIMV</th>
<th>SIMV + Pressure Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidal Volume</td>
<td>_ _ _ mL</td>
<td>PEEP _ _ _ cmH2O</td>
<td>Plateau Pressure _ _ _ cmH2O</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Peak Pressure (min) _ _ _ cmH2O Respiratory rate _ _ _ /min**  

**Patient position Flat  Head low  Semi-recumbent**

**At any time in these 24 hours (08:00 am today to 08:00 am next day), did the patient have**  

<table>
<thead>
<tr>
<th></th>
<th>Prone position</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyldoprolinoside or other steroid</td>
<td>Yes</td>
<td>No</td>
<td>If yes, Dose _ _ _ mg Day no. _ _ _</td>
</tr>
</tbody>
</table>

**Sedation**  
Did this patient receive intravenous sedation today?  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous infusion</td>
<td>Intermittent boluses only</td>
<td></td>
</tr>
</tbody>
</table>

**What were the drugs used for sedation (tick all that apply)**  

<table>
<thead>
<tr>
<th></th>
<th>Midazolam</th>
<th>Diazepam</th>
<th>Morphine</th>
<th>Fentanyl</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tramadol</td>
<td>Pentazocine</td>
<td>Buprenorphine</td>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Feeding**  

<table>
<thead>
<tr>
<th></th>
<th>Enteral</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, Route code (as per APPENDIX 5)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**What is being fed to the patient?**  

<table>
<thead>
<tr>
<th></th>
<th>Cooked food</th>
<th>Blended food</th>
<th>Prepared from commercial powders</th>
<th></th>
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<tbody>
<tr>
<td>Continuous feed</td>
<td>Intermittent bolus feeds</td>
<td>Prokinetics</td>
<td>Parenteral Nutrition</td>
<td>Yes</td>
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</tbody>
</table>

**Central Nervous system**  
**ICP monitoring  | Yes  | No  |**

**Miscellaneous**  
Stress ulcer prophylaxis  

<table>
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<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes,</td>
<td>H2 blocker</td>
<td>Proton Pump Inhibitor</td>
</tr>
<tr>
<td>DVT prophylaxis</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Was this patient transported out of the ICU today?  | Yes  | No  | If yes  |  |

**Within the same hospital  Outside the hospital**
Indian ICU Case mix And Practice patterns Study (IndICAPS) (Outcome)

ISCCM Center No. .......................................................... Patient No. ..........................................................

Final diagnosis ....................................................................................................................................................................................................................................

Duration of ventilation ...................... days

Date of ICU discharge ................/................/ 2010 Time .......... : ............

Survival Status at ICU discharge

- Dead
- Alive

If the patient has died in ICU, did he die while on

- Full treatment
- Full treatment but no CPR
- Limitation or non escalation of therapy
- Withdrawal of life sustaining therapy

Was this patient a LAMA (Left against medical advice) or DAMA (discharged against medical advice) discharge ?

- Yes
- No

If discharged alive from ICU, the patient was discharged to

- Ward
- Intermediate unit
- Other ICU
- Other hospital Home
- Other, please specify

Hospital Outcome

Date of hospital discharge ................/................/ 2010

Survival status at Hospital Discharge

- Dead
- Alive

Exercitatio anatomica de motu cordis et sanguinis in animalibus (on the movement of the heart and blood in animals)

Author: Harvey W

Summary
In the early chapters, Harvey describes the motion of the heart during contraction and relaxation, realizing that there is no direct interventricular passage as Galen had believed, and that a new path connecting the right and left sides of the heart had to be found. He speculated: ‘why not conclude that the blood does pass through pores in the spongy lung tissue? He observed that the muscle mass of the heart was related to the metabolic needs in different animal species, and his description suggested that he realized that the heart had to generate the work to sustain the blood flow necessary to meet the metabolic needs of all the tissues. More remarkably, he seemed to understand the concept of atrial transport, and anticipate Starling’s law of the heart: ‘where so ever there is a ventricle there is an ear required... the ears not only (as in commonly believed) serve as the receptacle of blood (for what needs there any pulsation for the retaining of it?) but the ears do beat and contract themselves and the first movement of the blood are the ears which cast the blood into the ventricles and through their action it (the blood) is thrust out further and more swiftly... as when you play at ball you can strike farther and more strongly taking it on the rebound than you could only by throwing it out of your hand.’

The middle chapters describes the experiments that drove him to dismiss Galen’s theories about the circulation as ‘obscure, inconsistent and impossible to the thoughtful student.’ The key observations: (i) tight ligatures around the limbs prevent blood flow, to the extremities, (ii) the valves in the veins and the heart allow only unidirectional blood flow, and preclude significant oscillatory movement, (iii) blood volume is estimated to be one-tenth of body weight from exsanguinations experiments in sheep and other animals, (iv) the filled human ventricle contains up to 3 ounces of blood – if only 1 ounce was ejected in systole (he clearly understood the concept of ejection fraction), up to 80 pounds of blood would be ejected in under half an hour, (v) by milking the arm veins rapidly ‘more blood passes under one’s finger, in not too many minutes, than there is in the whole body’.

He concluded that, as the amount of blood both flowing from the heart into the arteries and returning to the heart in the veins, over a time of only half an hour was vastly more than the whole body could either contain or create from the food or drink consumed, the only logical interpretation was that ‘the same blood must be circulating around the body’.

The final chapters emphasize the importance of perfusion pressure for appropriate regional distribution of cardiac output, and describe the circulatory changes associated both with sepsis and low cardiac output: ‘...in boys with an undoubted fever the pulses are always swift and by gripping of their fingers. I could easily perceive from the pulse when the fever was in its strength and at times there may even be a pulse in the gums and teeth. On the other side when the heart beats faintly as in fainting, hysterical symptoms, defects of pulse, weak people and those that are departing, the pulse can be detected neither in the wrist nor the temples.'

Related references
A Brief Communication to the Worzburg Medical Society, where its importance as a method for determining cardiac output, and hence stroke volume, was immediately realized. Fick elucidated the general principle of indicator dilution, that the flow of a fluid may be calculated from knowledge of the amount of a substance added to or removed from the fluid stream, and the concentration difference resulting from such addition or removal. He illustrated the principle with reference to oxygen consumption (VO2) and carbon dioxide production (VCO2) and the resulting arteriovenous content difference of these gases. The accompanying diagram and mathematical statement illustrate that if the amount of oxygen absorbed by the lungs spacing and the oxygen concentrations in both arterial and mixed venous blood are known, the blood flow or cardiac output to achieve this consumption can be calculated. He pointed out that using the corresponding carbon dioxide data one could manage the other calculations. Using canine date on the oxygen content of arterial and venous blood, and from earlier calculations one could manage the other calculations. Using canine date on the oxygen content of arterial and venous blood, and from earlier calculations.

There was a close correlation between these calculations when performed in various ‘in vitro’ models and ‘in vivo’ animal experiments. Attention is drawn to the importance of the relationship between intrathoracic lung volume and factors which govern the filling of the left ventricle.

Related reference

Simultaneous determination of the greater and lesser circulation time, of the mean velocity of blood flow through the heart and lungs, of the cardiac output and an approximation of the amount of blood actively circulating in the heart and lungs.

Author: Hamilton WF, Moore JW, Kinsman JM, Spurling RG

Summary
This brief communication extended the principle of indicator dilution to the use of a detectable dye to calculate both cardiac output and effective intrathoracic blood volume. After a bolus intravenous injection of iodinated phenolphthalein, the changing concentration of this dye is measured in samples of arterial blood collected every 1-2 seconds. From this data, a dye concentration curve is plotted, which shows a brief delay after injection as the dye passes through the pulmonary circulation, followed by a rapid rise to a peak value at about 8 seconds, and then an exponential decline until recirculation of the dye causes a further rise. The mono-exponential form of the initial decline is described mathematically and projected to zero concentration from the point of recirculation (dotted portion of curve). The cardiac output is inversely proportional to the area under this ‘dye concentration-time’ curve, and the intrathoracic blood volume is the product of the mean circulation time and cardiac output.

Physiological studies of the effects of intermittent positive pressure breathing on cardiac output in man

Author: Cournard A, Motley HL, Werko L, Richards DW

Summary
This paper investigated the cardio respiratory effects of three different patterns of intermittent positive pressure ventilation. Thirty-three patients were admitted to the institution with acute poliomyelitis. Of these, 866 had paralysis and 316 were admitted to the institution with acute poliomyelitis epidemic of 1952. The studies showed that the cardiac output fell in proportion to the increase in mean airway pressure in Types I and II, but there was no change in cardiac output with Type III. The right ventricular transmural filling pressure (intravascular minus pleural pressure) decreased during the inspiratory cycle and increased during the expiratory phase with all three types of respiratory curve. The change in cardiac output was related to the change in mean transmural filling pressures. The conclusion was that during inspiration there is a fall in cardiac output that is compensated for during expiration. If the pressure drop in expiration is rapid, resulting in a low intrapleural pressure and high transmural pressure, the circulatory compensation will be complete, provided expiration is of sufficient duration. From a circulatory perspective, the airway pressure profile during intermittent positive pressure breathing should be a gradual increase during inspiration, a rapid drop during expiration, and an E/I ratio < 1 without positive end-expiratory pressure.

Related references

A preliminary report on the 1952 poliomyelitis epidemic in Copenhagen with special reference to the treatment of acute respiratory insufficiency

Author: Lassen HCA
Reference: Lancet 1953; i: 37-41

Summary
This paper describes the extraordinary events at Blegdamin Hospital in Copenhagen during the poliomyelitis epidemic of 1952. From 24 July to 3 December 1952, 2722 patients were admitted to the institution with acute poliomyelitis. Of these, 866 had paralysis and 316 had some degree of respiratory insufficiency. In four months, the hospital got three times as many patients with respiratory insufficiency as it had in the previous 10 years. At any one time, up to 70 patients required ventilatory support, and Dr. Lassen candidly admits that the hospital was in a state of war. At the start of the battle, negative pressure devices were the standard tools for ventilatory support. However, the hospital possessed only one tank and six cuirass respirators. Furthermore, the results using this equipment in the sporadic cases before the epidemic decrease in pressure during both inspiration and expiration, and an inspiratory to expiratory time ratio of unity, but with positive end-expiratory pressure throughout the cycle. Type II is a rapid increase and decrease in pressure, an increased E/I ratio, and a positive end-expiratory pressure. Type III is a gradual inspiratory pressure ramp, rapid expiratory drop in pressure, an E/I ration, of unity, and no PEEP.
were poor (mortality >80%), and had not been improved by the introduction of tracheostomy in 1948. The equipment and techniques available for patients with respiratory failure at the outbreak of the epidemic were inadequate, and this was reflected in mortality of 87% during the first month. At this point, after consultation with anesthetist Dr. Bjorn Ibsen, treatment for these cases was changed to include:

1. Early tracheostomy just below the larynx in those unable to maintain an unobstructed airway.
2. Suctioning and bronchoscopy via the tracheostomy.
3. Postural drainage.
4. Positive pressure ventilation via a cuffed rubber tube inserted into the tracheostomy.

Two hundred patients required continuous or intermittent ventilation, some over 3 months. Insufflations was carried out manually, by medical students working in shifts. The change in mortality for cases of respiratory insufficiency following the introduction of these techniques was effective, falling from 87% to 40%.

Related references


This paper is both a landmark in medical science and a fascinating historical document.

**Ventricular function: Starling's law of the heart studied by means of simultaneous right and left ventricular function curves in dog**

**Author**: Sarnoff SJ, Bergland E

**Reference**: Circulation 1954;9:706-708

**Summary**

Starling stated in his Linacre lecture on ‘Law of the Heart’ that ‘the energy of ventricular contraction, however measured, is a function of the length of the muscle fibres prior to contraction.’ Over the following 40 years, a number of studies questioned the validity of this statement, and particularly whether it was relevant to the intact circulation. Sarnoff and Bergland argued that these studies were variously flawed, since (a) cardiac output, stroke volume, or ventricular work per minute, and not stroke work, were used as measures of the energy of contraction, (b) some compared right atrial pressure and left ventricular work, (c) a single ‘Starling’ curve could not be expected to explain all observed phenomena, and there were in fact a series or ‘family’ of curves for each ventricle – a different relationship or curve would apply if all factors that could influence myocardial contractility were not held constant. This paper investigated the applicability of Starling’s Law of the heart in the intact canine circulation. An anesthetized, open chest dog model (which avoids the confounding effects of changes in intrapleural pressure) is described, in which atrial filling pressures were manipulated by infusing or removing blood from the circulation by raising or lowering a reservoir that was connected by a cannula to the right atrium. Cardiac output, heart rate, atrial filling pressures, and systemic and pulmonary artery pressures were continuously recorded as circulatory manipulations were performed. Over 300 sets of data were obtained under controlled conditions, and ventricular stroke work was calculated and plotted against the corresponding atrial filling pressure. The resulting ventricular function curves demonstrated a consistent relationship between these two variables, provided that factors that could alter myocardial contractility were held constant. The effects of severe anemia, coronary artery occlusion, and epinephrine were studied, and confirmed their hypothesis that a family of curves existed for each ventricle, with a different relationship applying when ventricular contractility was changed.

**Related references**

3. Patterson SW, Starling EH. The mechanical factors which determine the output of the ventricles. J Physiol 1914;48:357

**Acute Respiratory Distress in Adults**

**Author**: Ashbaugh DG, Bigelow DB, Petty TL, Levine BE

**Reference**: Lancet 1967; 2 : 319-322

**Summary**

The respiratory distress syndrome in 12 patients was manifested by acute onset of tachypnea, hypoxemia, and loss of compliance after a variety of stimuli; the syndrome did not respond to usual and ordinary methods of respiratory therapy. The clinical and pathological features closely resembled those seen in infants with respiratory distress, and the conditions in congestive atelectasis and postperfusion lung. The theoretical relationship of this syndrome to alveolar pressure surface active agent is postulated. Positive end-expiratory pressure was most helpful in combating atelectasis and hypoxemia. Corticosteroids appeared to have value in the treatment of patients with fat embolism, and possibly viral pneumonia.

**Related references**


**Experimental pulmonary edema due to intermittent positive pressure ventilation with high inflation pressures: protection by positive end-expiratory pressure.**

**Author**: Webb HH, Tierney DF


**Summary**

This landmark study examined the effects of different inflation pressures and the presence or absence of PEEP on lung histology, lung compliance, and gas exchange using a rat model. The anesthetized animals were ventilated with room air via tracheostomy for 1 hour (or until death), with a peak airway pressure (PAP) of 14, 30, or 45 cm H₂O. A further control group received no ventilation. A PEEP of 10 cm H₂O was applied to half of the animals ventilated at PAPs of 30 and 45 cm H₂O. The tidal volumes were correspondingly higher in those animals ventilated at higher pressures for a given level of PEEP.

Unventilated lungs and those ventilated with a PAP of 14 cm H₂O showed no histological changes. There was mild perivascular edema in the rats ventilated at 30 cm H₂O with or without PEEP, and in the rats ventilated at 45 cm H₂O with PEEP. In contrast to these mild derangements, all rats ventilated at 45 cm H₂O without PEEP had marked hypoxia and died before the end of the hour. The lungs from this group had reduced compliance and severe perivascular and alveolar edema.

**Mechanical ventilation: American College of Chest Physicians, Consensus Conference**

**Author**: Slutsky AS


**Summary**

Within this section, this article is unique as that it does not introduce new research or data. Instead, it is the summary of a meeting of experts within the field of mechanical ventilation of the critically ill, held in early 1993. The experts were drawn from different disciplines of medicine (anesthesiology, critical care, pulmonary medicine, surgery) and from several continents. The conference, and this article, attempted to synthesize the fields of physiology, research (basic, animals, and clinical), and clinical experience into recommendations for practice. Ideal practice of mechanical ventilation in Critical Care is not clearly defined, and there is an imbalance of data. On one hand, there is a wealth of physiological information, research in animals,
and extensive clinical experience. Added to this are technological advances that allow detailed monitoring and new modes of ventilation. On the other hand, at the time of the conference, there was a paucity of large randomized clinical trials addressing ventilation in Critical Care settings. Without these, one must extrapolate as best as one can, and this is the basis and strength of the paper. It provided the physiological rationale, and summarized research in the field, offering specific recommendations where possible. In some areas, no specific recommendations could be made – notably the ideal method of weaning, and which mode of ventilation is best.

The most important principles highlighted are given below:

1. The need for frequent reassessment of the ventilatory support in the critically ill patient.
2. The recognition that mechanical ventilation is associated with adverse consequences.
3. In order to minimize these adverse consequences, it is not necessarily desirable to restore certain parameters to the normal range (for instance, the high inflation pressure required to normalize the arterial CO$_2$ tension may be more harmful than the high CO$_2$ itself)
4. Alveolar over-distention is injurious. In an attempt to provide a quantitative guide, the consensus opinion was that plateau pressures should be limited to < 35 cm H$_2$O if there was no evidence of increased chest wall elastance. This was viewed as more important than limiting the partial pressure of inspired oxygen.
5. Clinicians should be aware of the existence, measurement, and treatment of dynamic hyperinflation (auto PEEP), which can have serious cardiovascular consequences and can go unrecognized if not looked for (see the review of the paper by Pepe and Marini earlier in this chapter).
6. Although, the qualitative effect of a manipulation of the ventilator may be predictable (for instance, increasing minute ventilation will usually decrease PaCO$_2$) the magnitude of change is not easily predicted in an individual patient.
7. Manipulation of a ventilator setting designed to improve one parameter may adversely affect another parameter. For instance, increasing PEEP may increase arterial oxygenation but simultaneously decrease cardiac output, such that total oxygen delivery is decreased.

**Optimum end-expiratory airway pressure in patients with acute pulmonary failure**

**Author:** Suter PM, Fairley B, Isenberg MD  
**Summary**  
Suter and colleagues made a careful study of the cardiopulmonary physiology of 15 mechanically ventilated patients with acute respiratory failure secondary to major trauma, surgery, infection, or metabolic disturbance. All had a pulmonary artery catheter, enabling assessment of cardiac output and mixed venous oxygenation. With tidal volumes set between 13 and 15 ml/kg, positive end-expiratory pressure was increased from zero to a level which ‘markedly decreased cardiac output’. Total lung and chest wall compliance and functional residual capacity were measured. The arterial oxygen content increased and the intrapulmonary shunt decreased with increasing levels of PEEP. However, the cardiac output fell at higher levels of PEEP, tending to reduce oxygen transport. The term ‘best PEEP’ was coined to describe the value at which oxygen transport was maximal. This value was highly variable among patients, but there was a loose negative co-relation between the initial FrC and the best PEEP, suggesting that its benefits are due to lung recruitment. Furthermore, the value of best PEEP corresponded to that which maximized the lung’s compliance.

**Related references**

<table>
<thead>
<tr>
<th>DATE</th>
<th>CONFERENCE NAME</th>
<th>CONTACT DETAILS</th>
</tr>
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<tbody>
<tr>
<td>1st to 3rd September 2010</td>
<td>Sepsis 2010</td>
<td>Paris, France&lt;br&gt;Phone : +44 1794 5113&lt;br&gt;Email : <a href="mailto:Sepsis@indexcommunications.com">Sepsis@indexcommunications.com</a>&lt;br&gt;Website : <a href="http://www.sepsisconference.com">http://www.sepsisconference.com</a></td>
</tr>
<tr>
<td>24th September 2010</td>
<td>Symposium on Shock</td>
<td>Dr RK Singh&lt;br&gt;SGPGI, Lucknow&lt;br&gt;Cell no. 09415189124 • Email: <a href="mailto:ratender@sgpgi.ac.in">ratender@sgpgi.ac.in</a></td>
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<tr>
<td>25th to 26th September 2010</td>
<td>FCCS course</td>
<td>Dr RK Singh&lt;br&gt;SGPGI, Lucknow&lt;br&gt;Cell no. 09415189124 • Email: <a href="mailto:ratender@sgpgi.ac.in">ratender@sgpgi.ac.in</a>&lt;br&gt;Dr Manish Munjal&lt;br&gt;Email: <a href="mailto:drmmunjal@hotmail.com">drmmunjal@hotmail.com</a></td>
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<td>9th to 13th October 2010</td>
<td>23rd ESICM Annual Congress</td>
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<td>16th to 18th November 2010</td>
<td>Doppler-Echocardiography in Intensive Care Medicine</td>
<td>Brussels, Belgium&lt;br&gt;Phone : +32 2 555 3631&lt;br&gt; +32 2 555 3631&lt;br&gt;Fax : +32 2 555 4555 • Email : <a href="mailto:sympicu@ulb.ac.be">sympicu@ulb.ac.be</a>&lt;br&gt;Website : <a href="http://www.intensive.org">http://www.intensive.org</a></td>
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<td>3rd to 5th December 2010</td>
<td>The Difficult Airway Workshop</td>
<td>Dr Sheila Nainan&lt;br&gt;Tata Memorial Hospital, Mumbai – Maharashtra&lt;br&gt;Cell no.: +919820156070 • Email: <a href="mailto:sheila150@hotmail.com">sheila150@hotmail.com</a></td>
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<tr>
<td>10th to 12th December 2010</td>
<td>16th annual conference of the Indian Society for Parenteral and enteral nutrition</td>
<td>Dr. Sunit Singhi, Organizing Chairperson&lt;br&gt;Dr. Gurpreet Singh, Organizing Secretary&lt;br&gt;PGI, Chandigarh</td>
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<td>15th to 19th January 2011</td>
<td>Critical Care Congress (Society of Critical Care Medicine)</td>
<td>San Diego, United States&lt;br&gt;Website : <a href="http://www.sccm.org">http://www.sccm.org</a></td>
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<tr>
<td>17th to 21st February 2011</td>
<td>17th annual Congress of the Indian Society of Critical Care Medicine</td>
<td>Praveen Khilnani, Organizing Chairmen&lt;br&gt;Deepak Govil, Organizing Secretary&lt;br&gt;Surinder S. Arora, Organizing Secretary&lt;br&gt;Indraprastha Apollo Hospital, Sarita Vihar New Delhi&lt;br&gt;Ph : +91 11 26925858&lt;br&gt;Email : <a href="mailto:congress@criticare2011.org">congress@criticare2011.org</a> / <a href="mailto:info@criticare2011.org">info@criticare2011.org</a>&lt;br&gt;Web : <a href="http://www.criticare2011.org">www.criticare2011.org</a></td>
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<tr>
<td>13th to 17th March 2011</td>
<td>6th World Congress on Pediatric Critical Care</td>
<td>Sydney, Australia&lt;br&gt;Phone : +61 2 9265 0700 begin_of_the_skype_highlighting +61 2 9265 0700 end_of_the_skype_highlighting&lt;br&gt;Fax : +61 2 9267 5443 • Email : <a href="mailto:pcc2011@tourhosts.com.au">pcc2011@tourhosts.com.au</a>&lt;br&gt;Website : <a href="http://www.pcc2011.com">http://www.pcc2011.com</a></td>
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<tr>
<td>22nd to 25th March 2011</td>
<td>31st International Symposium on Intensive Care and Emergency Medicine</td>
<td>Brussels, Belgium&lt;br&gt;Phone : +32 555 36 31 • Fax : +32 2 555 4555&lt;br&gt;Email : <a href="mailto:sympicu@ulb.ac.be">sympicu@ulb.ac.be</a> • Website : <a href="http://www.intensive.org">http://www.intensive.org</a></td>
</tr>
</tbody>
</table>
Fast Acting Local Mucolytic

3 times more potent & 5 times faster acting than N-acetylcysteine (NAC)¹

- Fluidifies bronchial secretions and facilitates aspiration²
- Disintegrates blood clots by its lytic action upon the mucus embedded in the fibrin network³
- Effective on blood clots alone and on mixed blood and mucus clot⁴
- Improves patient status by reducing post-bronchoscopic complications⁵
- Can be co-administered with bronchodilators, such as salbutamol and with corticosteroids like methylprednisolone⁶

77 % increased solubilisation of structured mucus by Mistabron® unlike NAC, Saline

<table>
<thead>
<tr>
<th>Inhaled substance</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saline</td>
<td>0</td>
</tr>
<tr>
<td>Propylene glycol</td>
<td>16</td>
</tr>
<tr>
<td>Tyloxapol</td>
<td>18</td>
</tr>
<tr>
<td>Argin</td>
<td>18</td>
</tr>
<tr>
<td>Urea</td>
<td>24</td>
</tr>
<tr>
<td>NAC</td>
<td>36</td>
</tr>
<tr>
<td>Alpha - chymotrypsin</td>
<td>55</td>
</tr>
<tr>
<td>Hyaluronidase</td>
<td>67</td>
</tr>
<tr>
<td>Mesna [Mistabron]</td>
<td>77</td>
</tr>
</tbody>
</table>

Indications:
- During the post operative period to prevent pulmonary complications
- In chronic bronchitis
- In bronchial emphysema
- In bronchiectasis

Dosage:
- Nebulizer: 3 – 6 ml per day in 1 to 4 sessions (maximum of 26 ml per day)⁷
- Instillation: 1 – 2 ml every hour until fluidification is achieved (maximum of 26 ml per day)⁷

Abbreviated Prescribing Information
MISTABRON® (Mesna®)

1. Mesna product monograph
6. Prescribing Information
The Critical Care Communications
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