O2 Equipment

How we increase the FIO2 to a Patient Using RC Equipment

What Is FIO2?

- Fractional concentration of Inspired Oxygen
  - Usually expressed: .21 or 21%
- Atmosphere: Oxygen , Nitrogen
  - CO2(.004%), arrgon, krypton

Equipment Issues

- How it works?
  - Add oxygen with flowmeter
  - Bags to contain O2 attach
  - Special air/oxygen entrainment devices
- Dangers or malfunctions:
  - Wrong concentration
  - Patient toxicity

Devices

- Nasal cannula & catheter :
  - Most common way of administration, especially the cannula.
    - Patient comfort with cannula
      - They can talk
      - They can eat
      - Don't feel clostrophobic
    - Hazards
      - Skin breakdown
      - Drying of mucus membranes
      - Patient can pull it off

Cannula Continued…

- FIO2 range under normal conditions:
  - .22 - .40
    - Liter flow 1 Lpm to 5-6 Lpm never more than 8lpm.
- Abnormal, like low Minute volume, Hypoventilation, tachypnea:
    - Up to 1.00 oxygen
- Short term, no humidity device.
- Long term, bubble humidifier is used.

Masks

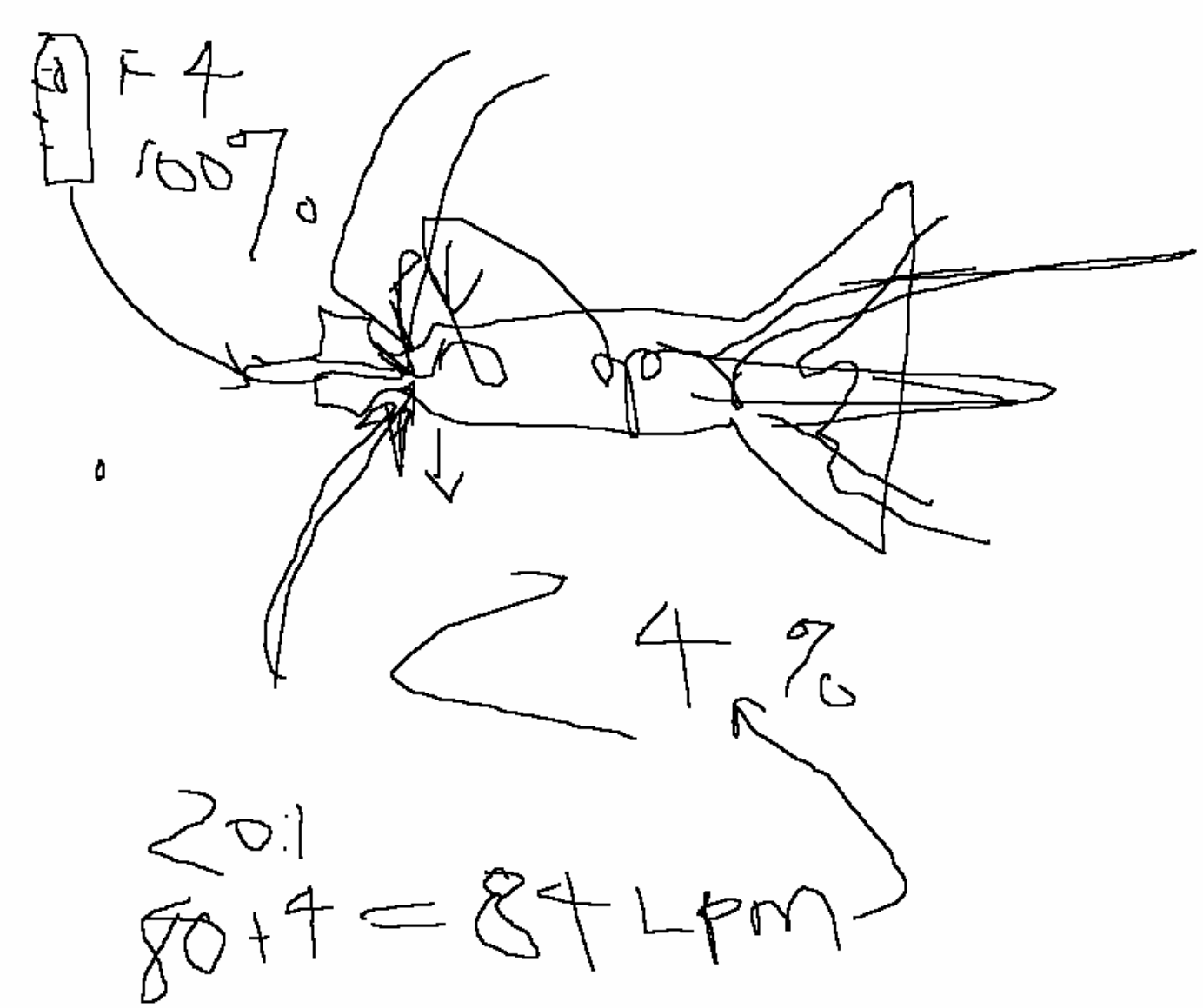
- Simple mask:
  - No bag
  - Delivers .40 - .60 oxygen
- Partial Rebreather mask:
  - With bag
  - Rebreathe first 1/3 of exhaled air
  - High in O2
  - Delivers approximately .60 - .80

Masks continued…

- Non-rebreathing mask:
  - With a bag
  - Also has extra one-way valves
  - Valves prevent rebreathing of exhaled air
  - Delivers 95% +/- 5 %
  - Emergency O2 delivery
  - Deliver mixed gases, like, helium/Oxygen or CO2/Oxygen

Venturi Mask

- Mix-o-mask
- Premixes room air and oxygen to high flow delivery in order to control concentration.
- HAFOE – High Air Flow Oxygen Enrichment
- No bags, no moving parts.
- Delivers .24, .28, .30, .35, .40, .50
- Patient breathing pattern does not effect concentration of delivered O2



Other O2 equipment…

- Adult tents
  - .50 - .70
  - Patient care more difficult
  - Leaks cause FIO2 to drop
  - Fire hazard
- Children's tents and croupettes
  - Same as above
  - .40 - .60

O2 equipment summary…

- Need way to give O2 to patient.
- Typically above room air all the way to 1.00
- Must be able to control or estimate
- Monitor
- Feedback from blood O2 levels
- Increase or decrease FIO2 depending on PaO2 and other indicators of hypoxia.

Room air is 20 lpm
Oxygen source is 4 lpm

What FIO2 are we delivering?

HINTS:

1. First, find out how much O2 is in the room air
2. Then, how much O2 from source
3. Total these two
4. Divide total Oxygen by total gas flow

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Oxygen source is 4 lpm

What FIO2 are we delivering?

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Total these two
Divide total Oxygen by total gas flow

8.2/24 = .34 FIO2

20lpm of RA = 20000 x .21 = 4200 ml of pure O2

4 lpm of 100% O2, thus 4 + 4.2 = 8.2 total O2

20 of RA + 4 of O2 = 24 total

Room air is 10 lpm
Oxygen source is 8 lpm

What FIO2 are we delivering?

HINTS:

1. How much O2 is in the room air
2. Then, how much O2 from source
3. Total these two
4. Divide total Oxygen by total gas flow

Room air is 10 lpm
Oxygen source is 8 lpm

How much O2 in FIO2 are we delivering?

First, find out how much O2 is in the room air
Then, how much O2 from source
Total these two
Divide total Oxygen by total gas flow

10.1/18 = .56 FIO2

10lpm of RA = 10000 x .21 = 2100 ml of pure O2

8 lpm of 100% O2, thus 8 + 2.1 = 10.1 total O2

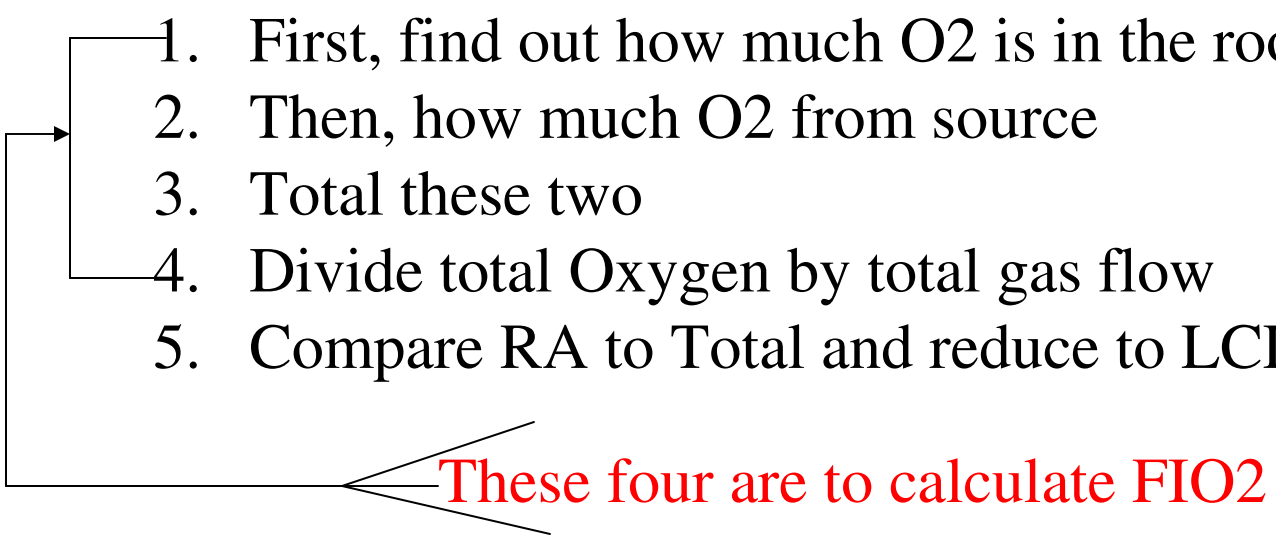
10 of RA + 8 of O2 = 18 total

Room air is 9 lpm Oxygen source is 6 lpm

What FIO2 are we delivering?
Tell me the ratio of air to oxygen in this mixture?

HINTS:

1. First, find out how much O2 is in the room air
2. Then, how much O2 from source
3. Total these two
4. Divide total Oxygen by total gas flow
5. Compare RA to Total and reduce to LCD



Room air is 9 lpm
Oxygen source is 6 lpm

How much O2 in FIO2 are we delivering?
Tell me the ratio of air to oxygen in this mixture?

1. First, find out how much O2 is in the room air
2. Then, how much O2 from source
3. Total these two
4. Divide total Oxygen by total gas flow
5. Compare RA to Total and reduce to LCD

7.89/15 = .53 FIO2

9 ra x .21 x 1000 = 1890 ml of O2

9:6 3:2 1.5:1

6 lpm of 100% O2, thus 6 + 1.89 = 7.89 total O2

9 of RA + 6 of O2 = 15 total