Duchenne Muscular Dystrophy: Corticosteroid Treatment

PPMD Annual Conference
CONNECT

Douglas Biggar,
Bloorview Kids Rehab,
Toronto, Canada.
### Why Corticosteroids in DMD?

Corticosteroids can change the course of DMD
- reduced weakness
- preserved motor function

But .....It’s best to be taken daily
- side effects are common
Corticosteroids in DMD

References:

- Manzur AY. et.al. Glucocorticoid corticosteroids for Duchenne Muscular Dystrophy. The Cochrane Library, 2004
- Bushby K. et.al. Consensus statement on the current role of glucocorticoid corticosteroids in Duchenne Muscular Dystrophy. UK North Star Network. Available at the ENMC.org website.
Corticosteroids in DMD

Summary:
- Corticosteroids help muscle strength
- Prednisone and deflazacort both work
- They slow the progression
- Start when boys are walking
- Best to give every day, once a day
- Balanced discussion of benefits and risks
- More studies are needed
More studies are needed

More than 10 different protocols

- 10 days on:10 off, high weekend dose, every other day, 20 days on:10 off, etc.

Yes..

- fewer side effects with weight, height, and behaviour

But..

- 10-15 year comparison with daily steroids needed
What are the benefits?

**Short-term**
- some, but not all have increased energy
- Long-term, 10-20 years
  - walking
  - breathing
  - heart
  - spine
  - arm strength
What are the common risks?

**Endocrine**
- Puberty Delay
- Adrenal gland not working well
- Water build up (frequent urination)
- Short

**Eye**
- Cataracts on back of eye lens

**Skin**
- Hair Growth
- Red face
- Stretch marks
What are the common risks?

**Nervous System**
- Headaches (mild and more often)

**Stomach**
- Vague aches and pains
- Some heart-burn
- Weight gain
Patterns of Weight Gain

Thin

- Less than 25\textsuperscript{th} percentile
- Small muscles
- Lordosis, sway back
- Eat anything, anytime
- Often tolerate prednisone
Patterns of weight gain

Heavy

- eating habits vary from a bird to an elephant
- rapid weight gain after 5 years
- off the chart by 10-12 years
- genetics might play a role
- very, very difficult to control
- steroids often get “blamed”
Patterns of weight gain

In between
- Average weight around 4-6 years
- Increases as mobility changes
- More than the 75\textsuperscript{th} percentile by 8-10 years
- Diet can help, but…
- Life style change for whole family
What are the common risks?

Brittle Bones
- Fractures
  - Back bones
  - Long bones

Infections
- Warts
- Athletes foot
Uncommon risks

**Endocrine**
- Diabetes

**Eyes**
- Poor vision
- Glaucoma

**Skin**
- Poor healing
- Bruises
Uncommon risks

**Stomach**
- Ulcers
- Bleeding
- Rupture
- Inflamed pancreas

**Nervous System**
- Seizures
- Pressure on the brain

**Infections**
- Viral Infections
Arbitrary, 4 – 6 years of age

When parents tell us:

- Stairs are more difficult
- Falling more
- Difficulty getting up from floor
- They are ready
Preserved Muscle Function
Walking

**With corticosteroids**

- walk 3-5 years longer
Preserved Pulmonary Function
PULMONARY FUNCTION

FVC Percent Predicted

Age in years

10 15 18

Untreated
Treated
At 18 years, boys on steroids should have:

- a better cough
- fewer admissions to hospital for pneumonia
- no increased lung infection
- very few should need nocturnal ventilation
Delayed Scoliosis
Scoliosis Surgery in DMD

Steroid treated:

- 10% of boys
- compared to 90% **not treated**, 
- Can self-feed after surgery
Preserved Cardiac Function
## Cardiac Function

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Deflazacort</th>
<th>(P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>16 ± 2</td>
<td>14 ± 2</td>
<td>NS</td>
</tr>
<tr>
<td>LVEF(&lt;45%)</td>
<td>58%</td>
<td>5%</td>
<td>0.001</td>
</tr>
<tr>
<td>% fractional</td>
<td>21 ± 8</td>
<td>33 ± 7</td>
<td>0.002</td>
</tr>
</tbody>
</table>
What about his bones?
What makes bones healthy?

- Genetics
- Physical activity
- Other things: calcium, vitamin D etc
What about my son’s bones?

- Even young have reduced bone density
- Worse with reduced walking
- ~25% have long bone fractures
- Vertebral (back bone) fragility fractures only occur with steroids
Can we start later?

Yes but…

- Long-term benefits are not known
- Pulmonary function might benefit
- Heart? Spine?
- Research study underway
Can we stop the steroids?

Yes but...

- Think twice
- Wean slowly with physician guidance
- Benefits lost rapidly and not regained if you restart steroids
Conclusions

Benefits of should outweigh side effects

Major benefits of preserved:

- walking
- pulmonary function
- cardiac function
- straight spine
- arm and hand function
Sooooo for today....

- Corticosteroids are the best we have
- Most boys have some benefit
- Buys time
- But there is a price, and
- With research & clinical trials tomorrow will be better
Getting the best for our boys by staying CONNECTED

Thank You!

Doug Biggar, MD, FRCP(C)
Bloorview Kids Rehab
What are the common risks?

- Endocrine
- Eye
- Skin
- Stomach
- Nervous System
- Brittle Bones
- Water Balance
- Infections
More questions than answers
Most boys have osteoporosis
What will predict his risk of fractures?
Possibly worse with steroids
Risk of fractures, controversial
  Long bones
  Vertebrae
Can be treated, if indicated
More research needed