SCREENING FOR HORMONE INSUFFICIENCY AND MONITORING THERAPY
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SCREENING FOR HORMONE INSUFFICIENCY AND MONITORING THERAPY

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    - Ph: 260 436 1248
    - Established 1999
Four Pillars of Vitality

- DIET
- EXERCISE
- NUTRITIONAL SUPPLEMENTATION
- HORMONES
  - Chronic Fatigue is a symptom of an accelerated aging process
NATURAL HORMONES

- Bio-identical
- Exact match to the human hormone
- Lock and key mechanism
SCREENING FOR HORMONE INSUFFICIENCY
CLINICAL PRESENTATION

- MALAISE AND FATIGUE
- FIBROMYALGIA
- DIABETES MELLITUS
- METABOLIC SYNDROME
- WEIGHT GAIN
- UNEXPLAINED WEIGHT LOSS
- OSTEOPOROSIS/OSTEOPENIA
CLINICAL PRESENTATION

- HOT FLASHES AND/OR PMS
- LOW LIBIDO
- ERECTILE DYSFUNCTION
- ANORAGASMIA
- DEPRESSION
- DYSLIPIDEMIA
- FAMILY HISTORY OF THYROID DISORDERS
COMMON HORMONAL IMBALANCES

- Hypothyroidism
- Hyperthyroidism
- Thyroiditis
- Androgen deficient states
- Menopause
- Adrenal Fatigue
- Vit D deficiency
- HGH deficiency
LAB TESTS

- TSH, Free T4, Free T3
- Thyroid Auto-antibodies
- IGF-1
- IGFBP-3
- Cortisol (AM)
- Testosterone, FSH/LH, DHEA-S
- Estradiol, Estrone, Progesterone in women
- 25-OH Vitamin D, PTH, COMP MET PANEL
- Fasting Insulin/C-peptide
BLOOD VS SALIVA TESTING

- Up to 80% failure rate on salivary testing due to improper collection, handling and processing. - Dr. Paul Ling Tai

- NAMS found little evidence supporting use of salivary testing to determine dosing of HRT. -- Menopause. 11(3):356-357, May/June 2004
BLOOD VS SALIVA TESTING

- Significantly elevated salivary levels of progesterone may persist weeks after stopping topical progesterone.
- Salivary progesterone levels may give misleading information about uterine protection—false sense of security.
BLOOD VS SALIVA TESTING

- It is the blood that carries the hormones to its target cells and not the saliva.
- There is no endometrial protection or bone with OTC progesterone creams and yet these creams produce very high salivary levels and low serum P levels.
DYNAMIC TESTS

- TRH Stimulation test: Subclinical Hypothyroid and Hyperthyroid states
- Cortrosyn Stimulation Test: Cortisol deficiency
- GnRh Stimulation Test: Differentiate primary versus secondary Hypogonadism
- Arginine Stimulation Test: Growth Hormone Deficiency
ADRENAL HORMONES

- Cortisol
- DHEA
- Pregnenolone
ADRENAL HORMONES

- Cortisol
  - Maintains blood pressure
  - Stress hormone
  - Increases blood sugar
  - Reduces inflammation
ADRENAL EXHAUSTION

- Autoimmune
- Viral
- Aging
- Chronic disease process
- Chronic stress
- Environmental Toxins--Dioxin
DIAGNOSIS

- Low levels of DHEA and cortisol as well as testosterone
- Low dose cortrosyn stimulation test
- History of steroid use
DHEA

- Helps repair damaged cells
- Boosts immune system
- Over 2500 papers published documenting multiple benefits of DHEA
- OTC products likely contain contaminants
DHEA

- Prescribe in sustained release micronized form for better absorption
- Monitor levels to keep in mid to upper one third of normal range
- Most common side effect is Acne
DHEA

- Precursor of various steroid hormones
- Neurotransmitter
- Levels low in obesity and metabolic syndrome
- Improves T cell activity
DHEA

- Chronic Fatigue Syndrome
- Lupus
- Rheumatoid Arthritis
- Patients on Prednisone therapy
- HIV wasting syndrome
- Osteoporosis
- Depression and memory loss
DHEA

- Start with 5mg SR capsules in women
- Titrate upwards
- Usual dose is 10-50mg in women and 50 to 100mg in men
- Watch for acne and oily skin
DHEA

- Blood levels to be checked periodically
- Keep around 2000 to 3000 ng/dL
- May need to settle for less if side effects
- SLE patients can tolerate large doses—200mg daily
MELATONIN

- START WITH 1-3MG SR PREPARATION
- GIVE DOSE EARLIER IF GROGGY IN AM
- MAY NEED AS MUCH AS 20MG
MELATONIN

- Potent Anti-oxidant
- Can cause hair to darken
- Only significant side effect is Nightmares
PREGNENOLONE

- Precursor to DHEA
- Made from cholesterol
- Potent memory enhancer
- Improves mental fatigue and helps with focus and concentration
- Prescribed in sustained release oral capsules
Testosterone

- Primarily a hormone secreted by ovaries and testes
- Adrenal exhaustion can lead to low testosterone in women
- Lack of libido and reduced muscle mass
TESTOSTERONE

- Replace using bio identical testosterone cream
- Monitor blood levels 2-4 hrs after dosing
- Remarkably well tolerated
- Only major side effect is acne
Testosterone has demonstrated improvement in mood and cognitive performance.

Testosterone improves muscle mass, abdominal fat, thin skin, frailty - all typical signs of aging that we accept as part of life.
TESTOSTERONE

- Androgen supplementation has shown favorable effects on most of the symptoms of aging
- Androgen replacement results in optimal health, strength, and sense of well-being
- Hormone therapy delays the aging process, prevents disability, provides men with the highest quality of life by symptom improvement
Testosterone in Men

- Improves stamina
- Improves cognitive function
- Improves muscle mass
- Reduces body fat
- Improves cardiac pump function
- Reduces bone loss
- Increases sexual function
Benefits of Testosterone in Women

- Improves Libido
- Protects Bone
- Improves Vaginal lubrication
- Increases bone mass
- Increase muscle mass
- Reduces body fat
- Reduces skin wrinkling
Both a male as well as a female hormone

Major source of testosterone in women is the ovary. Some production by the adrenal gland
METHODS OF TRT

Transdermal

- **Androgel**
  - 1% transdermal gel
  - 25mg and 50mg doses in packets

- **Compounded version**
  - Can customize gel or cream for specific needs
  - Can titrate to serum levels by varying percentage 1-20, and dose accordingly
  - Preferred method in most men
TESTOSTERONE IN MEN

- **PREFERRED THERAPY**
  - Testosterone cream 100mg/g
    - Start with 1/2g BID
    - Increase if needed to 1g BID
    - Monitor levels 2-4 hrs after dose to optimal range
    - Check Total and Free Testosterone as well as SHBG
HCG

- If there is no Leydig cell failure can treat hypogonadism with HCG injections
- 2000-5000 units per week
- No decrease in testicular size or sperm count
- Can try as TRT or cycle with topical TRT every 3-6 months.

TESTOSTERONE IN WOMEN

- Use Testosterone cream 2.5mg/g vaginally if dryness is an issue
  - Dose: 0.2g once daily. Titrate up based on response and optimal levels
  - Back off dose if skin breakouts or hirsutism
  - Can combine with E or P creams
THYROID

- Weight Gain
- Fatigue
- Skin and Hair changes
- Cold intolerance with low core temp
- Constipation
- Infertility
- Depression
PHYSIOLOGY

- More than 99% of Thyroid Hormones are bound to TBG
- The “free” unbound fraction is available to enter the cells and interact with the receptor sites in the nucleus which causes production of mRNA
T3 versus T4

- T3 is clearly the more active hormone
- Most of the T3 comes from peripheral deiodination of T4 by Deiodinase enzyme (D)
- Several isoenzymes of D: D1, D2, D3
- D is very sensitive and affected by drugs and toxins
Diagnosing Thyroid Insufficiency

- Clinical symptoms
- Low normal thyroid numbers (T3 and T4)
- TSH may be “normal”
- Thyroid antibodies needs checked even if TSH is “normal”
Pitfalls in TSH interpretation

- May not reflect Thyroid activity in the periphery due to varying degree of sensitivities in different tissues.
- Pituitary may not increase TSH production although the peripheral tissues need more thyroid.
- Commonly seen in ICU patients but perhaps a milder degree in outpatients.
What is the optimal TSH level?

- Historically analogous to blood sugar levels for diagnosing Diabetes--threshold has been reduced over the years
- There was a time when a TSH of 5-10uU/ml was deemed normal
- Perhaps the optimal upper limit ought to be 2uU/ml or even 1.5uU/ml???
TREATING THYROID INSUFFICIENCY

- Replace both T3 and T4
- Compounded thyroid combination containing T4/T3 in a 4:1 ratio to mimic “Armour Thyroid”
- Titrate dose monthly till symptoms resolved and thyroid levels are high normal. TSH may need to be suppressed below 1
- Aim for “optimal” versus “normal”
Is combination T4/T3 better?

- “In patients with hypothyroidism, those that received combination T4/T3 did far better by objective cognitive testing, as well as reported well being and mood”
- These patients received 10% of their replacement dose as T3
  - NEJM Feb 1999
Pitfalls in thyroid replacement

- Do not confuse “Normal” with “Optimal” levels
- Treat the patients and not the numbers
- TSH may not be as reliable as previously thought
TYPES OF THYROID DEFICIENCY

1. Primary—due to thyroid gland failure
2. Secondary due to pituitary failure
3. Tertiary due to hypothalamic failure
4. Non-thyroidal hypothyroidism = poor conversion of T4 to T3
- TSH normal = .3 to 3.7 Derived from the average population = inexact and not designed to measure optimal

- True hypothyroidism involves low levels of T4 and T3, eventually

- TSH felt by some experts to be abnormal if >2.0
In early primary hypothyroidism, Free T3 & Free T4 levels are always normal. Not until the TSH is high do Free T3 levels fall low causing symptoms.

Types 2, 3, 4 of hypothyroidism have low Free T3 levels, but normal TSH.

Some people do not adequately convert T4 to T3 (defective 5’deiodinase enzyme activity).

Compounded Thyroid is best; some need it BID.
“The Thyroid Solution” by Professor Ridha Arem, endocrinologist, documents what I’ve been teaching: Patients with normal blood tests respond to thyroid therapy.
THYROID REPLACEMENT

- Armour Thyroid = Westhroid = Natural Porcine
- Compounded Thyroid = 38 to 42 ug T4 plus 8-10 ug T3.
- Compounded Thyroid is the preferred thyroid regimen as a sustained release T3 and regular T4 preparation.
- Armour Thyroid = 38ug T4 plus 9ug T3, but it is not sustained release and therefore has a short half-life.
- Compounded thyroid is the preferred choice.
- Mainstream Physicians dislike Armour
“Grains” versus “milligrams”

- 1 grain = 60mg of thyroid
- Titrate in 1/4 to 1/2 grain increments or 15 to 30mg increments
- 1 grain of Armour contains 38mg of T4 and 9mg of T3
ARMOUR split dose regimen:
- 8 am and 1 pm
- Better tolerated
- More effective
- Useful for fatigue, weight loss
- Cheaper

Best Regimen: sustained release compounded thyroid: $\frac{1}{2}$ 1 2 3 grain Q am
Literature recommends a compounded preparation to be: T4 80ug and sustained release T3 20ug, though a recent study suggests that a 9:1 ratio may be better.

Any dose can be given, but I stick with the standard Armour equivalent dose of T4 38ug and T3 9ug, or 40mg/10mg.

May use Compounded Thyroid QAM and QPM in severe cases of fatigue or dysfunction.
The symptom complex of fibromyalgia is frequently seen in hypothyroidism.

Hypothyroidism has now been categorized, like DM, into type 1 (hormone deficient) and type 11 (hormone resistant).

There is now evidence to support that fibromyalgia may be due to thyroid hormone resistance.

Overlapping symptom complexes suggest that CFS, PMS, Gulf war syndrome, stress disorders, breast implant silicone sensitivity syndrome, systemic candidiasis, myofascial pain syndrome, environmental intolerance are due to thyroid resistance.

Experimentally proven treatment with supraphysiologic doses of thyroid hormone improves symptoms.
VITAMIN D

- The “Sunshine Vitamin”
- Skin converts cholesterol into Cholecalciferol (D3)
- Liver converts this into 25 Hydroxy D3
- Kidneys convert this further into 1, 25 Hydroxy D3
VITAMIN D

- Not enough sunlight north of Atlanta
- RDA of 400-800 IU per day prevents rickets but does not promote optimal health
- Optimal intake ranges from 2500 IU to 7500 IU per day based on literature review
VITAMIN D

- Virtually every cell has the mechanism to convert 25(OH)D3 into 1-25(OH)D3
- The kidneys use up the bulk of the 25(OH)D3 to maintain calcium balance
- Hence it is necessary to give larger doses to “saturate” the kidneys
VITAMIN D

- When intake or production of Vit D3 is suboptimal, very little available for use by other tissues other than the kidneys.

- The intracellular conversion of 25 OHD3 into the 1,25 OH D3 is responsible for the beneficial effects seen.
1,25 OH D3

- Apoptotic to cancer cells particularly breast and prostate
- Modulates the immune system (reduces pro-inflammatory cytokines)
VITAMIN D DEFICIENCY

- EPIDEMIC IN THE US
- IMPLICATED IN A VARIETY OF CONDITIONS
  - MS
  - OSTEOPOROSIS
  - DEPRESSION
  - CHRONIC FATIGE/FIBROMYALGIA
  - VARIOUS CANCERS
TOXICITY?

- All reported cases of toxicity had intake of >40,000 IU per day
- Hypercalcemia
- Vit D3 can be considered a “pro-hormone”
WHAT TO MEASURE

- SERUM 25-OH D3 LEVELS
RANGE OF 25 OH D3

- 20 ng/ml to 80ng/ml
- 50nmol/L to 200nmol/L
- Do not be content with “normal”
- Aim for “optimal” which is the upper end of “normal”
TREATMENT WITH VIT D3

- USE 5000 IU DAILY AND RECHECK 25 OH D3 IN 6-8 WKS
- MAY NEED TO USE 10,000 IU 5 DAYS A WEEK IF GOALS NOT REACHED
- MONITOR SYMPTOMS
GOOD REFERENCE ARTICLE

- Vitamin D3: scientifically defining the optimal dose
  - Stephen Olmstead, MD et al

More than 50 references in this review article
Human Growth Hormone

The “Healing Hormone”
Growth Hormone

“The overall deterioration of the body that comes with growing old is not inevitable...We now realize that some aspects of it can be prevented or reversed.”

- Daniel Rudman, M.D.
  *The New England Journal of Medicine*

1990 Jul 5;323(1):1-6
Life without GH is poor, both in quantity and quality.

GH peaks at puberty and begins to decrease at 21.

At age of 60 most adults have total 24-hour secretion rates indistinguishable from those of hypopituitary patients with organic lesions in the pituitary gland.

If IGF-1 of 300 is mean normal for 20-30—almost all >40 have IGF-1 deficit.
Aging GH levels change quality of sleep

- Decreased slow wave sleep
- Somatopause begins 25-35 and is completed by 40’s
- This was life expectancy before modern civilization
- GH replacement should begin at a younger age
- At 65 years tissues have been exposed to low GH for 2 decades

Human Growth Hormone

- Recombinant DNA source
- Humatrope, Genotropin, Nutropin, Saizen
- Bio-identical to human molecule
- Well studied with over a decade of use in adults with GHD
- Injection only
- Oral secretagogues ineffective
Symptoms of HGH insufficiency

- Chronic Fatigue
- Loss of endurance
- Loss of concentration
- Social Isolation
- Lack of drive and vigor
- Diminished sleep quality
Clinical Manifestations of HGH deficiency

- Osteoporosis
- Loss of muscle mass or sarcopenia
- Increased skin wrinkling
- Central adiposity
- Atherosclerosis
- Insulin resistance
- Reduced immunity and healing
DOSING OF HGH

- 2mcg to 20mcg per Kg per day
- Average dose is 0.2 to 0.6mg per day
- Dose at bedtime
- Can dose 6 days a week to prevent down regulation of receptors