

学校における身体指標による思春期やせ症スクリーニング

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近年日本では、やせ傾向の小学生、中学生、高校生が増加する中で、単なるやせすぎではない思春期やせ症(神経性食欲不振症)が小学校高学年以降に増えている。また最近では低年齢化が著しく患者の多くが小学校高学年～中学生で発症し、初経発来前の発症も激増している。しかしながら学校保健現場では本症についての知識の普及が不十分なため、早期発見ができずに、病状が進行し高度の「やせ」に陥ってから医療機関における治療が開始される症例が多い。このような思春期やせ症は難治性で、体重減少が深刻化する前の早期発見・早期治療が必要である。

スリム志向が蔓延する現代の学校ではやせ傾向を呈する生徒が多く、「やせ」のみを指標とした思春期やせ症のスクリーニングは、二次検診対象者数が多くなり現実的ではない。しかしながら、「食行動の異常」や「無月経」の有無を考慮した思春期やせ症のスクリーニングは、一般的な学校保健現場ではこれらの情報を入手しにくく実施が難しい。学校保健現場での思春期やせ症早期発見には、身体計測値のみを指標とした簡便で効率の高いスクリーニングの方法が必要である。

＜学校健康診断における思春期やせ症の早期発見方法＞

われわれは、成長曲線および脈拍数に関する研究成果から、学校健康診断における特異度の高い思春期やせ症のスクリーニング方法を提唱している。実際の方法としては、①学校健康診断の身長・体重値から、性別、年齢別、身長別標準体重の-15%以下の「やせ」を呈する生徒を抽出し、該当者の中から、②これまでの身長・体重値から作成した成長曲線上体重が1チャンネル以上下方へ逸脱し、年齢相応の期待される体重増加が認められない生徒を選び出し、さらに該当者について、③保健室において脈拍数を計測し、徐脈(60/分未満)を合併する生徒は思春期やせ症を疑い医療機関へ紹介し精密検査を実施している。なお、該当する生徒を医療機関へ紹介受診させる場合には、思春期やせ症を疑っていることを強調すると、生徒の抵抗が強いことが多い。体重減少、徐脈、無月経などの身体症状の精査を主要目的として、検診をおこなう事が肝要である。

慶應義塾一貫教育中学校では、2000年から2002年にかけて女子生徒に思春期やせ症の患者が急増したが、今回報告した早期発見、早期介入方法を実践し、2004年度以降は高度なやせ状態に陥ってから発見される症例をゼロに抑えることに成功している。

学校保健現場では「やせ」と「徐脈(脈拍数 60/分未満)」の2つの指標を組み合わせることによって、簡便で効率のよい思春期やせ症のスクリーニングが可能である。

Screening for anorexia nervosa using physical measurement values in school health practice

Mitsuaki Tokumura Health Center, Keio University

In Japan, both male and female underweight primary, secondary and high school students have currently been increasing. This is evident from the 60 years of data from our national school health examination systems. Among the underweight students, patients with anorexia nervosa increase from the upper grades of primary school. Our nation-wide survey in 2002

showed a point prevalence of 2.3% in 17-year-old female high school students. In addition, younger patients have markedly increased in recent years. Anorexia nervosa develops in the upper grades of primary school and secondary school in many patients, and children who develop anorexia nervosa before menarche have also markedly increased.

However, anorexia nervosa is not widely known in school health. In many students, anorexia nervosa is not detected early, and hospital treatment is initiated after progression of the pathological condition to severe "emaciation". Early detection and treatment before serious weight loss are indispensable.

Among school children, the desire to be slim is widespread and there are many "underweight" students. Therefore, screening for anorexia nervosa using only those who are "underweight" as parameters is not practical, because the number of subjects requiring re-examinations is high. Also screening for anorexia nervosa based on the presence of "abnormal dietary behavior" or "amenorrhea" is impractical, because obtaining correct information is difficult in the general school setting where there are no medical workers with appropriate knowledge. For the early detection of anorexia nervosa in the school health system, a simple and efficient screening method is necessary. Only physical measurement values obtained in the school health examinations can be used as parameters.

[Screening for anorexia nervosa in school health examination]

We have proposed a screening method for anorexia nervosa in school health practice based on the results of our previous studies of growth curves and pulse rates in patients with anorexia nervosa. Screening is performed by the following procedure.

(1) Based on height and weight values in school health examinations, underweight students ($\leq -15\%$ based on the age- and height-specific standard body weight index) are identified. (2) Among these underweight students, those who are showing a downward shift of weight by ≥ 1 channel on a growth curve are selected. (3) With the underweight students showing downward shift of weight by ≥ 1 channel on the growth curve, the pulse rate is measured by the school nurse. Students with bradycardia ($< 60/\text{min}$) are suspected to have anorexia nervosa and referred to medical institutions for close examination.

When students are referred to medical institutions, excessive expression of the suspicion of anorexia nervosa often leads to denial in the students and also resistance is a common reaction. It is important to tell them that the main purpose is the close examination of physical symptoms such as weight loss, bradycardia or amenorrhea.

In Keio Gijuku secondary school (mixed school), female students with anorexia nervosa have increased from 2000 to 2002. However, we have performed the early detection and intervention methods reported today, and as a result, there have been no students detected after progression to severe emaciation since the academic year 2004.

In conclusion, for the early detection of anorexia nervosa in the school health system, a simple and efficient screening method using only physical measurement values as parameters is necessary.

思春期やせ症における徐脈 —徐脈は身体の休息願望を物語る—

福島裕之 慶應義塾大学医学部小児科

徐脈は思春期やせ症における重要な身体所見です。我々はこれまでの研究から、徐脈は相対的な副交感神経活動の優位性によりもたらされること、思春期やせ症の早期診断における有用な指標であることを明らかにしました。本セッションでは、「徐脈は身体の休息願望の表れであり、思春期やせ症の早期治療導入にも有用である」という点を中心にお話いたします。

思春期やせ症における徐脈の成因について心拍変動解析法を用いて検討したところ、徐脈は飢餓に対する適応(身体的防御反応)であることを示す所見を得ました。すなわち、思春期やせ症では、自律神経機能バランスが副交感神経活動優位に傾いており、その結果徐脈がもたらされると考えられました。冬眠中の動物では副交感神経活動が優位になっているといわれており、思春期やせ症の患者はいわば「冬眠中のリス状態」にあると思われます。冬眠は少ないエネルギーで生命を維持する有効な手段であり、思春期やせ症の心臓が「冬眠状態である」ことは理に合っています。別の見方をしますと、思春期やせ症の心臓は「省エネ運転中の自動車」に例えることもできるでしょう。思春期やせ症における徐脈は、「身体が休息を欲している」ことを如実に物語っているといえます。

思春期やせ症の治療を成功させるには、患者が自身の病態を理解し、治療に主体的に参加することが重要です。身体所見である徐脈は患者にも容易に認識することができ、「身体が休息を欲している」ことを理解するのに役立ちます。また、前記のような病態の例え話をすることにより、患者が自分の身体状況に興味を持ち、治療に主体的に参加することを促すことができると我々は考えています。講演では、具体的な早期治療への導入方法(慶応法)についても触れたいと思います。

Bradycardia in Anorexia Nervosa in Children and Adolescents

— Bradycardia as the Body's Plea for Rest —

Hiroyuki Fukushima Department of Pediatrics, Keio University

Bradycardia is one of the most representative physical signs manifested in anorexia nervosa (AN) in children and adolescents. The message of this presentation is that bradycardia represents the body's plea for rest, and is a useful tool for the early treatment of AN.

We analyzed the heart rate variability in patients with AN. The data indicated that bradycardia is due to relative parasympathetic hyperactivity and represents the body's defensive response against starvation. In hibernating animals, parasympathetic activity is also increased. Therefore, bradycardia in AN can be compared to that in a hibernating squirrel. Hibernation is an effective survival strategy which utilizes only a small energy reserve. From this point of view, it's reasonable to say that the hearts of patients with AN are also "hibernating". In other words, bradycardia can also be compared to a kind of energy-saving engine. Thus, the bradycardia in patients with AN represents "the body's plea for rest".

For successful treatment of AN in its early course, it is essential that patients themselves recognize their pathological condition and actively participate in the treatment. Our testing method for Bradycardia is a physical examination easily recognized by patients and helps them to recognize their body's plea for rest. In addition, we think that analogies about bradycardia help patients to be interested in their body's signs and actively participate in the early treatment. In the presentation, I would like to demonstrate how I explain the pathological condition to children and adolescents with AN and facilitate them to actively participate in the early treatment (the Keio Method).

やせたがる子どもらへの働きかけ

生野照子 神戸女学院大学人間科学部

やせる必要がないのに、「やせたい」と願う子どもたちが増えている。小学生でさえ、「お母さんと一緒にダイエットしている」と話す時代である。誤った体重コントロールが成長期の心身にいかに大きな影響を与えるということが、まだまだ知られていない現状がある。これは欧米などでも同様であり、若い年齢では「体型や体重に関するからかいを受けたこと」が摂食障害発症の契機として上位にランクされている。そのため、学校を足場とした予防啓発活動が行なわれており、有効な成果が報告されている。わが国では、まだこれからという段階であり、今後の取組みが急がれている。今回は、演者らが試行している「学校における予防・啓発活動」について述べ、その調査結果から今後の方向性を探してみたい。

講演概要 1. 子どもの摂食障害の特徴

2. 学校における予防・啓発活動

その方法について、 欧米での成果、
演者らの試み(中学～大学生に向けての活動)
成果と問題点

Preventative Work with Children with a Desire to be Thin

Teruko Ikuno Department of Human Sciences, Kobe Women's College

Recently, a tendency for children to “want to be thin” has been increasing even in children who are neither obese nor overweight. Today, it is common for primary school children to talk openly about dieting and there have also been cases of children dieting alongside their mothers. This proves our ignorance towards weight control during the course of physical development. The fact that inappropriate weight loss can have serious physical and psychological consequences does not seem to be common knowledge. Both in Western societies and in Japan, the majority of patients who suffered an early onset of eating disorders reported “having been teased about their weight”. In fact this is one of the most common triggers leading to eating disorders in children and preventative work in school settings has been widely imposed and significantly successful outcomes have been reported in the USA and Europe. In Japan, we are a stage behind those countries and imposing effective preventative work is urgently required.

Today, I would like to introduce the preventative work in school settings my colleagues and I have imposed. Results taken in these studies will be discussed and possible future directions of such preventions will be explored.

Outlines of the Discussion

1. Characteristics of the early onset of eating disorders

2. Preventative work in school settings

-Methods

-Successful outcomes in the USA and Europe

-Our work with secondary school, high school and university students

-Effectiveness and shortcomings

メディアや友人からの情報の受け取り方:個別性を考慮した予防教育に向けて

西園マーハ文

東京都精神医学総合研究所, 慶応義塾大学医学部精神神経科客員講師

ダイエット行動は、日本の女子学生の中で広く認められる。教師と養護教諭は、もし生徒がダイエットの危険を適切に理解すれば、摂食障害の一次予防は、可能ではないかと考えている。しかし、一次予防の努力は、いい面よりもより悪影響を及ぼすかもしれないことも報告されている。

私が東京の女子校において行った調査では、生徒達は、様々なダイエットについてメディアから情報を受け影響されていることが観察された。いわゆる「類は友をよぶ」(‘birds-of-a-feather-flock-together’ 同じ羽の鳥はむらがる)という現象、つまり摂食障害患者と個人的なつきあいのある生徒は、摂食障害を知らないかまたは興味のない生徒に比べて、Drive for Thinness subscale(EDI-2)というやせ願望スケールが高値を示していた。この‘鳥’たちの最も競争心の強い子の中から診断基準にあてはまる生徒がでるのであるだろうか？まわりに摂食障害になっている人がいることに気づくことが問題なのであるだろうか。

学校は生徒をひとかたまりのグループとして取り扱いがちであるが、健康情報が、適切に思春期女子により理解され身につくものとなるためには、そのようなダイエット情報へのアクセスがひとりひとり違うといった個人差を考慮に入れなければならない。

How do schoolgirls react to information on eating disorders from the media and their peers?— towards a more tailor-made approach to prevention programmes.

Aya Nishizono-Maher Tokyo Institute of Psychiatry

Department of Psychiatry, Keio University

Dieting is widely observed among schoolgirls in Japan. Teachers and school nurses often speculate that if pupils understand the danger of dieting properly, primary prevention of eating disorders would be possible. Conversely, it is reported that primary prevention efforts may do more harm than good.

I conducted research at a girl's school in Tokyo and observed that pupils are variously influenced by media information on dieting. There was also what can be called the ‘birds-of-a-feather-flock-together’ phenomena i.e. those who have had personal contact with an eating disorder patient have higher scores on Drive for Thinness subscale (EDI-2) compared to those who do not know or who are not interested in the disorder. Do the most competitive of these birds reach the diagnostic criteria? Is it the matter of noticing other people having eating disorders?

Schools tend to treat their pupils as a monolithic group but in order for health information to be properly assimilated by adolescent girls, such individual differences as familiarity to dieting culture must be taken into account.

日本の「女性」のかかえる問題から

中村このゆ 岐阜聖徳学園大学教育学部

過去30年間、我が国の女性の間で摂食障害が大きな社会問題となっている。摂食障害が社会文化的な傾向、特にスリムな体を手に入れなくてはならないといった社会文化的流れの産物であるのは言うまでも無い。日本では、このような傾向が小学生の間にも広がっており、EAT-26を用いた調査結果をここで示す。そして、日本女性の社会での位置付け、及び、さまざまな自己破壊主義的な行動を誘う、商業化された“理想”の女性像をフェミニストの観点より探る。

加えて、東アジア文化における保守的ジェンダーロール(性別役割)は、意識的にも、無意識にも大幅に女性を制限している。ステレオタイプ的女性像が一種の内的抑圧の原因となっていることが、摂食障害を持つ患者との臨床経験により所見される。筆者は臨床の場でユング派の手法を一部用いている。患者の夢を取り上げ、日本女性の内的抑圧と、苦闘を紹介する。

キーワード: 摂食障害; 内的抑圧; “理想”の女性像

Struggles among Japanese women with conservative gender roles in floods of “ideal” feminine images through commercialism

Konoyu Nakamura, PhD Department of Education, Shoutoku University

In Japan, eating disorders among women have been becoming a huge social problem for the past three decades. It is clear that eating disorders are developed by sociocultural modes, especially pursuing thinness. This paper first shows such behaviors have recently spread over even elementary school girls in Japan by research using EAT-26. Then, I attempt to explore from feminist perspectives the social status of Japanese women and “ideal” feminine images in floods of commercialism, which drive them to diverse self-destructive behaviors.

In addition to these, conservative gender roles in East Asian culture also greatly restrict women consciously or unconsciously. Stereotyped feminine images function as a sort of internal oppression, which is observed in much clinical experience with patients with eating disorders. I take on in part Jungian approaches on my clinical work. Reporting a dream, I will show internalized oppression among Japanese women and their struggles.

Key Words: Eating Disorders, internalized oppression, “ideal” feminine images

資料4c: Symposium for School Care Programmes for
Anorexia Nervosa in Keio 2005

Bradycardia in Anorexia Nervosa in Children and Adolescents: Body's Plea for Rest

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Bradycardia in AN

- a common symptom
- a useful predictive value for early diagnosis



a useful tool for early treatment?

The answer is "yes".



Take Home Messages

- Bradycardia in AN can be compared to that of hibernating animals or low revolution rates of an energy-saving engine
- Bradycardia implies "the body's plea for rest"
- These analogies are helpful for patients to recognize their pathologic condition and actively participate in the early treatment



Mechanism of bradycardia in AN

Bradycardia in AN is a consequence of relative hyperactivity of the parasympathetic nervous system



Bradycardia in AN is thought to be the body's defensive response against starvation

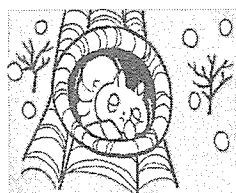


To what can we compare
the bradycardia of AN?

Hibernating animals!



Hibernating animal



Illustrated by Dr. Awazu

- No food consumption
- Low energy metabolism
- Bradycardia due to parasympathetic hyperactivity



To what can we compare
the bradycardia of AN?

Energy-saving engine!



Energy-saving engine



Illustrated by Dr. Awazu

- ↓ gasoline
- ↓ revolution rate
- ↓ power output
- risky to increase RPM
- Engine will stop if the gas tank becomes empty



Bradycardia in AN

- Hibernating animal
- Energy-saving engine

Bradycardia as the body's plea for rest!



How to use bradycardia as a tool
for early treatment of AN

-- The Keio Method--



The Keio Method

- a comprehensive program for teenage AN were created in the paediatric ward of Keio University Hospital
- team members:
 - child psychiatrists – leader
 - paediatric cardiologists, endocrinologists, neurologists, psychologists, trainee doctors, medical students and nurses



Key for successful treatment

Patients must

- recognize their pathologic condition
- actively participate in the treatment



Application of bradycardia for treatment

- Bradycardia is a physical examination easily recognized by patients
- Bradycardia helps patients to realize their body's plea for rest
- Analogies of bradycardia help patients to be interested in their body's signs and actively participate in the early treatment

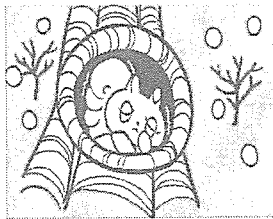
Let's measure pulse rate!



- by doctors or nurses
- by parents
- by patients themselves



You are like a hibernating squirrel.



Give her (yourself) a good rest!



Take Home Messages

- Bradycardia in AN can be compared to that in hibernating animals or low revolution rates of energy-saving engine
- Bradycardia represents “the body's plea for rest”
- These analogies are helpful for patients to recognize their pathologic condition and actively participate in the early treatment



Let's measure pulse rate.
You can do it!

- cardiologist
- psychiatrist
- general physician
- nurse
- school teacher
- parent
- children themselves



資料4d

指定討論

キャサリン・パイク先生

Eating Disorders: A Brief Look at Japan & the U.S.

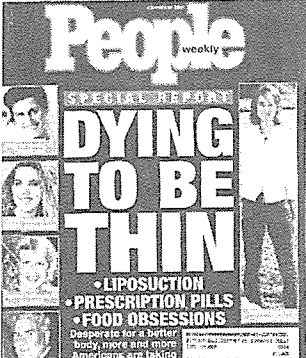
摂食障害 日本と米国を概観して

Keio University
August 29, 2005

*Kathleen M. Pike, Ph.D.
Visiting Fulbright Scholar, Keio University
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Themes for Comparison 比較のテーマ

- ◆ Trends in Eating & Weight Disorders 摂食障害の動向
- ◆ Treatment Access 治療へのアクセス
- ◆ School Based Prevention Interventions
- ◆ 学校に基づく予防的介入
- ◆ Evidence Based Treatments
- ◆ エビデンスに基づいた治療



Long History of Eating Disorders in North America & Europe

欧米の長い歴史

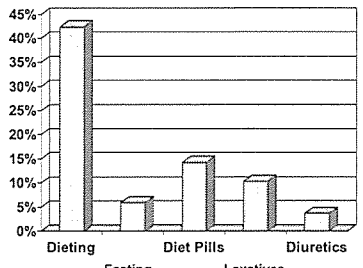
Japan has endorsed the Beauty Myth that Thinness will bring Happiness

やせれば幸せになれると美人コンテストは保証



Japanese University women with Possible Eating & Weight Disorders

食べ・やせ障害と思われる日本の女子大生

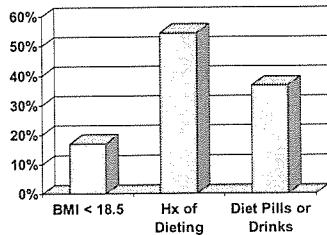


Disorder	Prevalence (%)
Dieting	45%
Fasting	10%
Diet Pills	15%
Laxatives	10%
Diuretics	5%

Nakamura et al, 1999

Japanese University Women with Possible Eating & Weight Disorders

食べ・やせ障害と思われる日本の女子大生



Maekawa, 2004

Eating Disorders among U.S. University Students

米国の大学生の摂食障害

Japanese Students had the: 米国の日本人学生は

- lowest weight (body mass index) 最低体重を示した(BMI)
- highest body dissatisfaction 最も自分の容姿に不満が強い
- highest self-loathing subscale score 最も自己嫌悪の尺度が高い

Yates et al, 2003



Weight Trends in the U.S.

米国の体重に関する動向

- Obesity is a global epidemic according to the World Health Organization (1999) WHOによると肥満は世界的に流行(1999)
- U.S. among the nations with the most severe problems: 米国は最も深刻な問題をもつ国
 - 30% of the U.S. population is obese (BMI > 30) 米国人の30%が肥満 (BMI>30)
 - 34% of the U.S. population is overweight (BMI: 25 - 29.9) 米国人の34%が過剰体重 (BMIが 25から 29.9)

Weight Trends in Japan 日本における体重に関する動向

- 20% of women in their 20's have a BMI of less than 18.5 kg/m2. 20代日本女性の20%がBMIが18.5未満
- 16% of women in their 30's have a BMI of less than 18.5 kg/m2. 30代女性の16%がBMIが18.5未満
- This is double the 1991 rate. これは1991年の倍
- This trend does not apply to men. 男性にはないこと

Ministry of Health, Labor, & Welfare National Nutrition Survey, 2001

Treatment Access 治療へのアクセス

U.S.: 米国

- Tremendous need for eating & weight disorders treatment 治療の需要が膨大
- Many private therapists 私費の治療者が多い
- Economic barriers to treatment 払えない人には治療は受けられない
- Inpatient treatment is driven by economic constraints 入院治療は経済的制約で決まる

Treatment Access 治療へのアクセス

JAPAN: 日本

- National Health Care 国民医療制度
- Limited Specialty Centers 少ない専門機関
- Social Stigma 社会的烙印

Prevention Interventions 予防的介入

U.S.: 米国

- Knowledge increases 知識は増える一方
- Eating problems decrease EDは減る方向
- No data documenting decrease in incidence of actual eating disorders
- 実際の摂食障害の減少を示すデータはない

Prevention Interventions 予防的介入

JAPAN: 日本

- Early Stages of Development 発展途上
- National Education System 国民教育システム
- Strategy of Early Identification as described by Dr. Watanabe may have tremendous potential 渡辺の早期発見指針には大きな可能性がある

Evidence Based Treatments

エビデンスに基づく治療

U.S.: 米国

- Major Trend in Clinical Care and Research 臨床と研究の主流
- Supported by American Psychiatric Association, American Psychological Association, Insurance Companies, and National Institutes of Health 米国精神医学会、米国心理学会、保険会社、NIHがサポート
- Challenge is dissemination and education 普及と教育が課題

Evidence Based Treatments

エビデンスに基づく治療

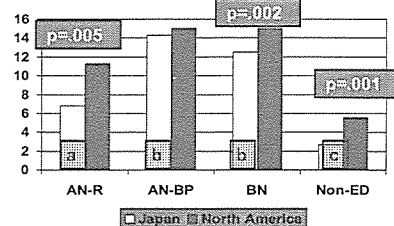
JAPAN: 日本

- Application of Evidence Based Treatments Limited エビデンスに基づく治療の応用は不十分
- Need for Training in Evidence Based Treatment エビデンスに基づく治療の研修が必要
- Adaptations for Japan – are they necessary? 日本の適応は一はたして必要か?

EDI Profile of Eating Disorders in Japan

Drive for Thinness: Japan vs. North America

やせの追求: 日本 対 米国



Pike & Mizushima, JED, 2005

Inpatient Treatment for Anorexia Nervosa:
Predictors of Outcome

Body Dissatisfaction ≠ Drive for Thinness
容姿への不満 / ≠ やせの追求

- ◆ Drive for Thinness: やせの追求は米国 > 日本
American > Japanese
- ◆ Maturity Fears: 成熟恐怖は日本 > 米国
Japanese > American
- ◆ Other Sources of Body Dissatisfaction:
e.g., More rounded figure, height, facial features
容姿への不満の他の原因: 例 ふっくらした体、身長、顔貌
Pike & Mizushima, 2004

Future Directions 将来の展望

- ◆ Develop integrated programs for Obesity and Eating Disorders Research and Treatment
肥満と摂食障害を統合した研究と治療の発展
- ◆ Increase Training Opportunities in Eating & Weight Disorders
摂食障害・体重障害の研修機会を増やす
- ◆ Invest in Training and Dissemination of Empirically Based Treatments
経験に根ざした研究と普及に投資する
- ◆ Adapt Treatments for Japanese based on Empirical Assessment of Evidence Based Treatments (assume the null hypothesis until proven false)
エビデンスに基づく治療の経験的評価に基づき、治療を日本人に適したものにしていく。
(違うとわかるまで金仮説を追求)

Academy for Eating Disorders
摂食障害アカデミー

<http://www.aedweb.org>

- ◆ International 国際的
- ◆ Trans-disciplinary 領域間連携
- ◆ Promoting excellence in research, treatment, and prevention of eating disorders 摂食障害の研究、治療、予防のレベルの促進
- ◆ Education, training, and collaboration、教育、研修、協力

資料4e:

ブライアン・ラスク教授 シンポジウム・講演会

- Lecture and Symposium
By Prof. Bryan Lask
University of London
The Huntercomb Hospital

主催:

慶應医学会

厚生労働科学研究(子ども家庭総合事業)「思春期やせ症と思
春期の不健康やせの実態把握および対策に関する研究」班

Anorexia Nervosa: in search
of a neurobiological substrate

思春期やせ症:

神経生理学的基質を求めて

Bryan Lask, University of London
ロンドン大学 ブライアン・ラスク

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- University of Newcastle, NSW, Australia

Anorexia Nervosa

思春期やせ症

Grossly inadequate, irregular, or chaotic food intake

ひどく少量の不規則でめちゃくちゃな食べ方

Relentless pursuit of thinness, with marked weight loss

あくことなきやせの追求と体重減少

Morbid preoccupation with wt/shape

体重/容姿への病的なとらわれ

Distorted body image

ゆがんだ身体像

Anxiety, depression, OCD, perfectionism

不安、抑うつ、強迫障害、完全壁

I wish someone could put a
screwdriver in my brain and make me
NORMAL

誰かが私の脳をねじ回しでなおしてくれたら

Anorexia nervosa

What is happening in the brain?

脳では何が起きているのだろうか ?

脳の構造変化
Structural Brain Changes
(CT and MRI)

- The major changes are: 主な変化は:
 - i) cortical atrophy ii) ventricular enlargement
大脳皮質の萎縮 脳室拡大
- Changes are secondary to starvation
飢餓による二次的变化
- Most changes reverse on weight restoration
体重が回復すると ほとんどの変化はもとに戻る

Functional imaging in AN
ANIにおける機能画像検査

SPECT

- regional cerebral blood flow (rCBF)
局所脳循環
- reflects brain metabolism and activity
脳代謝と脳機能を反映する

Sequence of studies (1995-2005)
1995-2005年 間の一連の研究

- Blood flow studies 脳血流研究
- Correlation of blood flow with other variables (EDE and BMI)
脳血流量と他の変数 (EDEとBMI)との相関
- Cognitive profiles 認知機能プロフィール
- Correlation of blood flow with cognitive profiles
認知機能プロフィールと脳血流の相関
- Follow-ups フォローアップ

Cerebral blood flow (rCBF) in AN
ANIにおける局所脳血流量 (rCBF)

- Unilateral reduction of blood flow in the temporal lobe in 13/15 children and adolescents
小児・思春期児15人中13人は側頭葉片側血流量低下
- Persistent reduction of blood flow after weight restoration in 3/4 of these patients
患児の3/4は体重回復後も脳血流量低下が持続
- No controls 対象群なし (Gordon et al 1997)

rCBF in Adults with AN
成人ANIにおける局所脳血流量

- 11 adult patients, mean age 27 years (19-39)
平均27歳(19-39)の11名の成人患者
- 11 adult controls, mean age 25 years (20-35)
平均25歳(20-35)の11名の成人対象者
- Reduced blood flow in 7/11 patients
11名中7名の患者で 脳血流量の低下が認められた
- Temporal lobe = 5; Caudate nuclei = 2; both = 1
側頭葉=5名 尾状核=2名 両方=1名
- Normal blood flow in all the controls
対象者の脳血流量はすべて正常 (Key et al 2005)

Correlation of cerebral blood flow with EDE and BMI in anorexia nervosa
ANIにおける脳血流量とEDEとBMIの相関

- Reduced blood flow in 11/15 children and adolescents
脳血流量が15名中11名で低下
- Temporal lobe focus in 9/11 (also parietal & frontal)
11名中9名で側頭葉に病巣 (頭頂葉と前頭葉も)
- Those with reduced blood flow showed higher eating disorder pathology
脳血流量低下を示す者ほど複雑な摂食障害病理
- No correlation between blood flow and BMI
脳循環とBMIの相関はない (Chowdhury et al 2003)

Cognitive Profile
認知機能プロフィール

- Average IQ 平均IQ
- Verbal / performance discrepancy 言語/動作性隔差
- **Enhanced** processing speed, verbal learning, visual attention, reading, spelling and associative learning.
機能促進: プロセス速度、言語学習、注視、読字、書字、連想学習
- **Impaired** visuo-spatial processing, visual memory, motor speed and executive functioning (Stroop and Hayling)
機能障害: 視-空間プロセス、視覚記憶、運動速度
- 遂行機能 (Stroop と Hayling) (Christie et al 2003)

Correlations between blood flow and cognitive profile, EDE, BMI and mood
脳血流量、認知機能、EDE、BMIと気分との相関

The most significant correlations were between reduced blood flow and:

最大の相関は脳血流と以下の項目との間:

- a) impaired visuo-spatial ability 視-空間認知障害
- b) impaired complex visual memory 複雑視覚記憶
- c) impaired cognitive inhibition 認知障害
- c) severity of eating disorder pathology 摂食障害病理の重さ

No correlations between any of: reduced blood flow, BMI, mood or length of illness
脳血流量、BMI、気分、罹病期間 間の相関無し

3 questions 3つの質問

- Do the abnormalities persist at follow-up?
この異常はフォローアップ時にも続くのか?
- What do they mean?
何を意味するのか?
- What next?
次は何か?

Question 1 質問1

Do the abnormalities in blood flow and cognitive profile persist at follow-up?

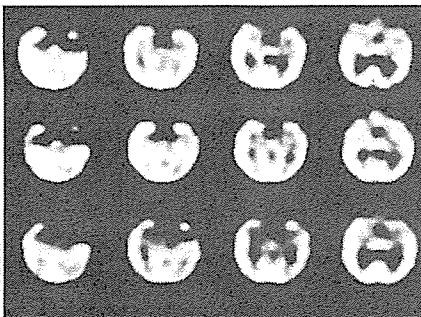
脳血流量と認知機能の異常は回復後のフォローアップでも認められるか?

初診時、9ヶ月後、17ヶ月後

AT PRESENTATION
WT/HT = 72%

9 MONTHS LATER
WT/HT = 96%

17 MONTHS LATER
WT/HT = 98%



Blood flow in weight-restored early onset AN

体重回復後の若年発症ANIにおける脳血流量

- No base line data
ベースラインデータ無し
- At 7 years follow-up 14/21 showed reduced blood flow
回復後のフォロー時に21名中14名の脳血流量低下
- No correlation between blood flow, BMI, and IQ
脳循環、BMI と IQ 間の相関は無い
(Raastam et al 2001)

Follow-up フォローアップ
i) At assessment 初診時評価では

- Reduced blood flow, predominantly temporal, in 15/21 patients
患者の15/21において主に側頭葉の脳血流量が低下
- No correlation between blood flow and BMI
脳血流量とBMIの相関無し
- Reduced blood flow group had higher ED psychopathology
脳血流量低下群はより複雑な摂食障害精神病理を呈する
- Reduced blood flow group had higher levels of impaired cognitive inhibition
脳血流量低下群はより複雑なレベルの認知障害を呈する
(Lask et al 2005)

ii) Follow-up study (mean 3 yrs)
フォローアップ研究 (平均3年後)

- Persisting reduced blood flow in 6/7 (86%) patients there was persisting eating disorder psychopathology
患者の6/7(86%)において脳血流量低下
- In those with persisting reduced blood flow
脳血流量低下の続く患者には
摂食障害精神病理が継続していた
- In those with persisting reduced blood flow there was persisting cognitive impairment
脳血流量低下の続く患者では認知障害も継続

Cognitive profile at follow up
フォローアップ時の認知機能プロフィール

- i) Improvement in motor speed
運動速度の改善
- ii) Persisting visuo-spatial deficits
視-空間認知障害の持続
- iii) Persisting executive functioning deficits
遂行機能障害の持続

Summary of follow-up
フォローアップ研究のまとめ

- Consistent finding of reduced blood flow, predominantly in the temporal region
側頭葉に脳血流量低下が継続する
- Reduced blood flow persists independent of weight restoration/BMI, and is often unilateral
脳血流量低下は体重回復/BMIと相関無くしばしば片側
- Executive functioning and visuo-spatial impairment persist independent of weight restoration/BMI
遂行機能障害と視-空間障害は体重回復/BMIと相関無し
- Reduced blood flow is associated with more severe eating disorder psychopathology and with cognitive impairment
- 脳血流量低下は重度の摂食障害病理と認知障害を伴う

Question 1 質問1

Do the abnormalities in blood flow and cognitive profile persist at follow-up?
脳血流異常と認知障害は回復後のフォロー時にも認められるか？

Yes はい

Question 2 - What does it all mean?
質問2 一体これは何を意味するのか？

The persistence of reduced blood flow and of cognitive deficits at follow-up, independent of BMI, indicates either:
BMIとの相関なく回復後も脳血流量低下と認知障害が続くのは以下のどちらかのためであろう:

- i) a primary phenomenon or
一次的現象か または
- ii) secondary changes that are slow to reverse, or are actually irreversible
回復に時間のかかる二次的変化か または 実際には非可逆性の変化か

◦ It is unlikely to be a secondary phenomenon given its specificity, localisation and enduring nature.

特異性、局在性と持続性より
これは二次障害ではないであろう

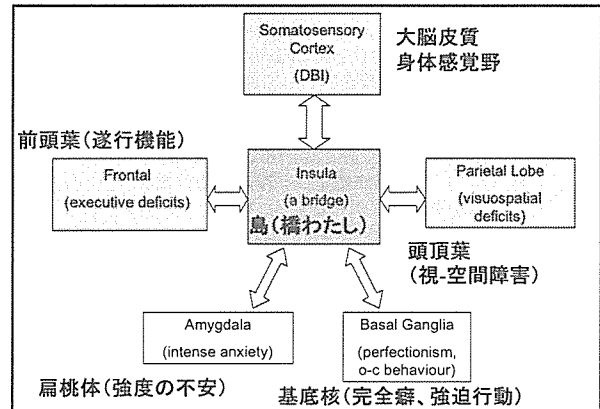
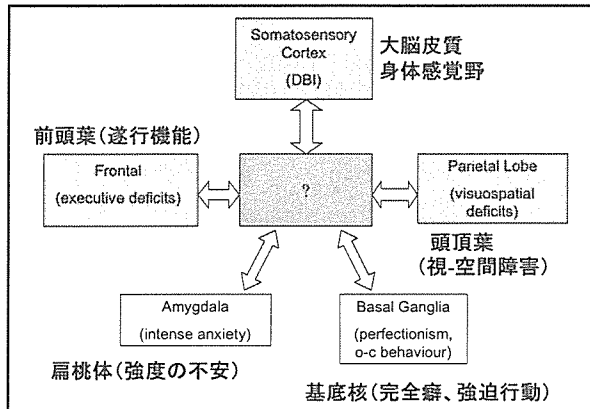
◦ If it is primary what might be its site and nature?

もし一次障害なら、部位と障害の性質は
どういふものなのか？

Key dysfunctions in AN and key regions ANIにおいて鍵となる機能不全と鍵となる部位

- | | |
|--|----------------------------------|
| i) Distorted body image
身体像の歪み | Somato-sensory cortex
身体-感覚皮質 |
| ii) Visuospatial deficits
視-空間障害 | Parietal cortex
頭頂葉皮質 |
| iii) Executive deficits
遂行機能不全 | Frontal cortex
前頭葉 |
| iv) Intense anxiety
強い不安 | Amygdala
扁桃核 |
| v) Perfectionism, perseveration
+ obsessive-compulsive behaviours
完全壁、執念深さ、強迫的行動 | Striatum
線条体 |

*How might these regions be bridged or connected?
これらの部位をどう橋渡しし つなげるか？*



The integrative and regulatory roles of the insula 島の統合制御機能

- i) ANS regulation 自律神経制御
- ii) Appetite and eating regulation - modulates the reward value of food 食欲と摂食の制御
一ごほうびとしての食物の価値を变容
- iii) Monitoring of body state and body-image 身体状態と身体像のモニター
- iv) Monitors the gut (hippocampus of the gut) 腸のモニター (腸の海馬)
- v) Reception, perception & integration of taste 味覚の受容、識別と統合
- vi) Perception and integration of disgust 嫌悪知覚と統合
- vii) Integration of thought and feeling 思考と感情の統合
- viii) Provides investment of emotion to language 言語に情緒を付与

In summary the insula is:

結論として島 insula は:

- i) central to the integration of autonomic, sensory and affective stimuli
自律神経、感覚刺激と情動刺激の統合の中枢
- ii) a key area in the neural control of intrinsic processes
内因性過程の鍵となる領域

The insular dysfunction/disconnection model

- 島insulaの機能不全/連合不全モデル
- i) There is an impairment within several circuits including cortical structures (frontal, somato-sensory + parietal) and sub-cortical structures (striatum + amygdala) 大脳皮質(前頭葉、身体-感覚+頂頭葉)と皮質下(線条体+扁桃体)を含む複数回路の障害がある
 - ii) Each of these circuits includes the insula as a central point of integration and regulation of information これらの回路のどれもが情報を統合し制御する機能中枢として島 insula を含む
 - iii) Due to insular dysfunction or disconnection there is a failure of integration and regulation of autonomic, sensory and affective stimuli 島insula機能不全または連合不全により、自律神経、感覚、情動刺激の統合不全と制御不全がおきている

Question 3

What next?

次は何？

i) Examine activity within this circuit incorporating brain imaging (fMRI) and neuro-psychological tests fMRIと神経心理検査を統合して回路の活動を検査

ii) Particular focus on executive and visuo-spatial functioning, anxiety and stereotyped behaviour 思考的視覚-空間認知機能、不安と情動行動に特に焦点をあてる

iii) Compare with normal subjects and control for:
i) age of onset, ii) length of illness, iii) personality, iv) nutritional status and v) co-morbidity
健常群と比較し以下の項目につきコントロール
① 発症年齢 ② 罹病機関 ③ 人格 ④ 栄養状態
⑤ 合併症

Potential fMRI tasks 潜在的機能的MRI課題

- Visual perception 視覚認知
- Visual memory 視覚記憶
- Body perception 身体認知
- Cognitive inhibition 認知抑制

Conclusions 結論

- i) There appears to be an abnormality, unrelated to weight, in a circuit involving cortical (frontal, somato-sensory and parietal) and sub-cortical structures (amygdala and basal ganglia) 体重と無関係に皮質(前身体-感覚野、頭頂野)と皮質下構造(扁桃体と基底核)に関する異常があるようである
- ii) The insula seems to be integral to these circuits 島insulaはこれらの回路を統合するようである
- iii) Given specific genetic and socio-cultural setting conditions, it could explain many of the features of AN, eg. DBI, executive and visuo-spatial deficits, anxiety and obsessive-compulsive behaviours. 特異的遺伝的、社会文化的な発症条件を考えても、脳内変化によりANの特徴(例 DBI、視-空間障害、不安、強迫的行動)を説明することができる

Our best guess is that dysregulation or disconnection in a circuit to which the insula is integral holds the key.

島insulaの統合する回路の制御不全または連合不全に解決の鍵がきっとあるに違いない

Now we need to refute this!

さてこれを活発に論駁しようではないか!

- Lask B, Gordon I, Christie D, Watkins E, Frampton I (2005) Neuroimaging in early onset anorexia nervosa. International J. of Eating Disorders: 37, S49-51
- Chowdhury, U and Lask, B. (2001). Clinical implications of brain imaging in eating disorders. Psychiatric Clinics of N. America: 24, 227-234

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fMRI 機能的MRI

- i) **Body image morphing:** (images of self & significant body parts)
身体像の形成 (自己と大事な身体部分のイメージ)
Prediction: in AN changes in activation in apical SSC and in anterior insular cortex. 予測: ANでは活性化により非典型的SSCと前島状皮質で変化
- ii) **Procedural learning task** (eg serial ordered pointing task)
動作的学习課題 (例: 連続的に指示された指差し課題)
Prediction: in AN changes in activation (KEN) compared to controls (IAN) or no difference
予測: ANでは活性化により(KEN)対象群(IAN)に比し変化するか 変化なし
- iii) **Food and non-food Stroop** 食物と非食物のStroop
Prediction: AN impaired in both tasks compared to controls
予測: ANでは対象群に比し 両課題で 障害
- iv) **Picture recognition task** 絵画認識課題
Prediction: AN impaired compared to controls
予測: ANは対象群に比し 障害
- v) **Stimulate disgust:** 嫌悪感の誘発
Prediction: in AN changes in activation in anterior insular cortex
予測: ANでは 活性化により 前島状皮質で変化