Epidemiology of Acne vulgaris

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Overview

- Background

- Objectives and Method

- Findings
  - Incidence
  - Natural history
  - Morbidity
  - Socioeconomic impact

Overview - 2

- Genetics
- Ethnicity
- Diet
- Sunlight
- Hygiene
- Smoking
- Obesity
- Stress
- Infection
- One or two others..

- Conclusion

Background

Epidemiology

- Incidence
- Prevalence
- Age, sex, social class
- Ethnic group and geography
- Natural history
- Risk factors for disease occurrence or progression

- Why is it important?

Objective

- To provide a comprehensive review on the Epidemiology of Acne vulgaris
  - (excluding acne rosacea, infantile acne, acne inversa)

- Baseline for future work
  - Provocation trial
  - Cohort study

Methods

- Medline database (in process and other non-indexed citations 1946-present)
- Embase 1974 to the end of January 2012
- NHS Evidence
- Acne vulgaris with epidemiology, aetiology, cause, prevalence, incidence, cost, pharmacoeconomics, socioeconomic, natural history, race, ethnicity, morbidity, quality of life, geography, family size, severity, excoriation, obesity, overweight, pathogenesis, washing, sweat, cleanse, sun, sunlight, light, diet, dairy, milk, GI, high GI, glycaemic/glycemic index, chocolate, hygiene, smoking, prevention, climate, environment, obesity, infection, Propionibacterium acnes (P. *acnes*), stress, picking, chloracne, drugs and medicine.
- Truncation to expand upon suffices
- No use of additional limits
- No pre-specified criteria for study exclusion or inclusion

Results and Outcome Measures

- 173 papers included!

- Outcome measures
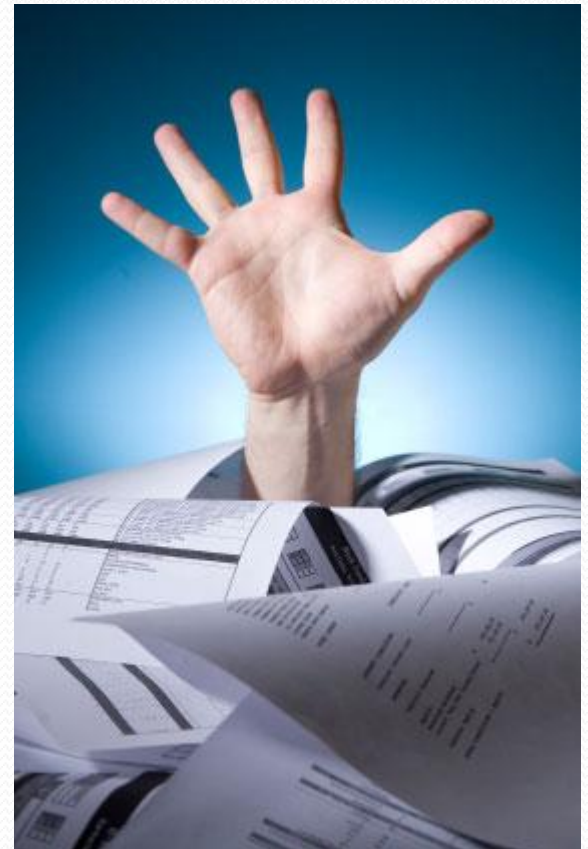
How common is acne?

- All people between 15 and 17

- 15-20% classified as moderate to severe

- Prevalence data and 1996 census data - prevalence rate in 12-24 year olds

- 50% of 10 and 11 year old have more than 10 comedones and almost 80% of 8.5-12.2 year old had a degree of acne

How long does acne last?

- Pre-pubertal children tend to have non-inflammatory acne – no sebum therefore no P. Acnes

- Average age of puberty has dropped over 15 years from 11.92 – 11.66

- Persists into adulthood – 64% of 20-29 and 43% 30-39 and 3-5% 40-49 year olds

How long does acne last? - problems

- Natural history difficult to assess - good availability of acne therapy therefore few high quality studies

    - Can pre-pubertal treatment alter P. acnes colonisation and subsequent inflammatory acne?

Morbidity

- Association with self-consciousness, impaired quality of life and anxiety

- Teasing, bullying, low attachment to friends, not thriving at school

- Females - greater impact

- The role of the media

- Halvorsen – questionnaire based, cross-sectional study, n =3775 suicidal ideation and substantial acne

- Magin – prospective cohort study – n=244

Socioeconomic impact

- Those from low socioeconomic backgrounds/rural areas referred less to a dermatologist

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- Acne more prevalent in higher socioeconomic classes

- Higher rates of unemployment over matched controls

- US – 6 billion dollars lost in direct and indirect costs of treatment and loss of productivity

- Negative effect on school and work performance with some studies indicating behavioural and emotional difficulties

Genetics

- 78% heritability in first degree relatives

- Earlier onset and increased severity in those with a positive family history

- Retrospective twin studies

- Larger twin based prospective study and further molecular genetic analyses needed
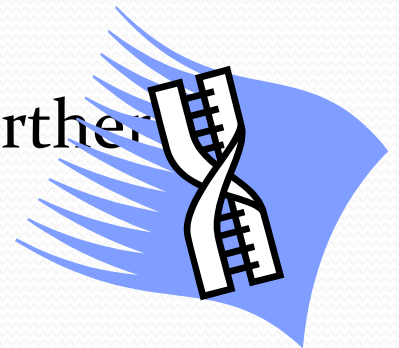
Ethnicity

- Early studies focused in on comparing outpatient presentations of Black and Caucasian patients
  - 1908 Fox et al, 7.4% Caucasian vs. 4.6% Black; 1912 Hazen et al

- Freyre et al, cross sectional study in Peru: Mestizo 43%, Indians 28%, Caucasian 44%

- General consensus regarding management is there is no difference between them

Pathophysiology by Ethnic group

- Small case series found a greater density of P. acnes in Black women (n=60)

- Sebum production increases during puberty and the onset of puberty is earlier in Blacks

- Studies into sebaceous gland size and activity inconclusive and contradictory

Specific problems associated with specific ethnic groups

- Hyper-pigmented macules/post inflammatory hyperpigmentation
- Keloid scarring
- Steroid acne
- Pomade acne

Diet

- Dietary advice was common place

- 1930's – studies suggested those with acne had altered carbohydrate metabolism and impaired glucose tolerance

- The roles of iodine, vitamin A, antioxidants, omega-3 fatty acids and fibre are not clear

- Some evidence of benefit for high doses of oral zinc from double-blind randomised controlled trials

Glycaemic Index

- Observational studies – Western countries

- Single blind RCT n=43, low GI arm compared to carbohydrate dense diet group, confounding factors

- Biochemical study
  - Glucose, insulin, leptin, glycaemic index or glycaemic loads in acne patients and controls

Dairy

- GI higher in skimmed milk

- Robinson, 1950, studied food diaries of 1925 patients

- Adebamowo
  - 2005, n=47,000, positive association between a history of acne and ingestion of skimmed milk

  - Girls 9-15, prospective, n=6000, positive association prevalence of acne and milks of all fat content.

  - Boys – association with skimmed milk only
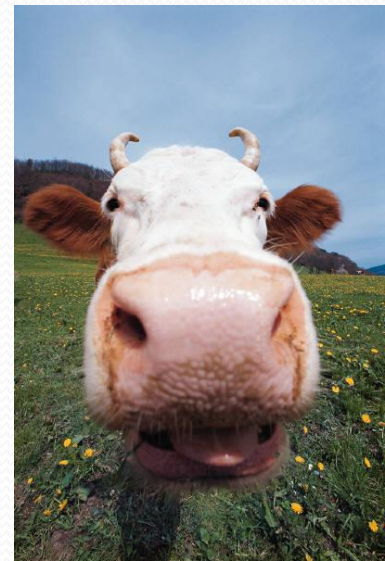
Chocolate…

- Well recognised belief that chocolate causes or exacerbates acne

- 1975 single blind, placebo controlled cross over trial 65 male prisoners - no difference in acne severity

- Recently, n=10 pilot study found increased severity of acne when consuming chocolate (100% cocoa)

Sunlight

- Magin et al, systematic review, 2005, 7 studies – no evidence

- Cochrane systematic review found some benefit of light therapy

- Limited evidence for natural sunlight as studies difficult to conduct

- Therapeutic sun exposure vs. skin cancer

Hygiene

- 2005 systematic review no evidence of a relationship with washing

- No studies comparing washing and no washing

- Single blind RCT comparing washing with a mild un-medicated cleanser 1/day, 2/day and 4/day improvement in 2/day group

- Less inflammatory lesions using acidic soaps than alkaline soaps, n=120, un-blinded, randomised

- Weak evidence of benefit in using medicated soaps

- Conflicting evidence from two studies for sweat exacerbating truncal acne

Smoking

- Early case series - inverse relationship? Anti-inflammatory component

- Questionnaire study -military men

- 2001 cross sectional analysis, n=896, correlation between acne prevalence and cigarette smoking

Stress

- Questionnaire based studies. 2011 Korean study

- Interventional study - relaxation training and stress reduction techniques

- Relatively few studies of acne caused by stress more stress and mental health problems as a result of acne

Infection

- First implicated in 1896

- P. acnes numbers between acne patients and controls - P. acnes in those with severe acne compared to mild
  - Is P. acnes a secondary coloniser in the anaerobic lipid rich environment?

- Ozolins et al - clinical efficacy of antibiotics against resistant strains – direct antimicrobial effect vs. Anti-inflammatory effect

- Shaheen et al, 2011 review

Variants

- Pre-menstrual acne flares

- Polycystic ovarian syndrome

- Chloracne

Ovarian cyst

- Tropical acne

- Drug induced:
  - lithium, steroids, phenytoin, isoniazid, gefitinib
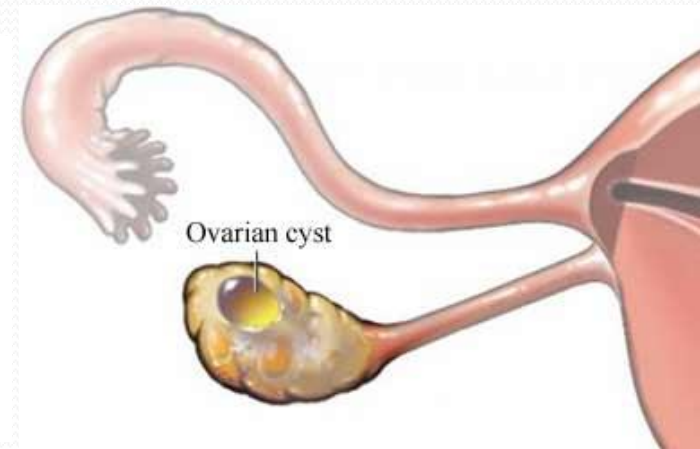
Summary and Conclusion

- Many observational studies - hypotheses but are limited

- Factors causing acne and those worsening acne

- Paucity of studies into the natural history of acne

- Better outcome measure required to collate individual studies to provide the highest quality of evidence