## Presentation 12 – Mihaela Aslan

ACETYLCHOLINESTERASE ACTIVITY IN GULF WAR
DEPLOYED AND ERA VETERANS: SEP '05 UPDATE

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OVERVIEW OF PROJECT

• Original questionnaire study conducted among deployed
and non-deployed veterans in Iowa Gulf War Cohort
Study (B. Doebbeling, et al.)

• Potential role of cholinergic enzyme activity proposed
(e.g., neurologic processes may have been affected
by deployment to Persian Gulf; H. Soreq, et al.)

• VA project was organized; original analyses completed;
**additional analyses of AChE-R presented today**

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DETAILS RE: SOURCES OF DATA

Questionnaire responses from Iowa Gulf War Cohort Study
• Wave I: 3,695 veterans of Persian Gulf era, from Iowa
• Wave II: 374 case patients with cognitive dysfunction,
depression, or chronic widespread pain; 228 controls
without these conditions (N=602 subset of Wave I)

Laboratory assays (of stored sera) at Hebrew University
• Acetylcholinesterase (AChE)
• Butyrylcholinesterase (BChE)
• Paraoxonase, Arylesterase (PON1, Aryl)
• **R splice variant of Acetylcholinesterase (AChE-R)**

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DETAILS RE: METHODS

• Questionnaire data transferred, data dictionaries reviewed,
study variables defined and coded

• Blood samples shipped; original laboratory assays
conducted; **AChE-R measured in second phase of project**

• Data from questionnaires and laboratory assays merged

• Analyses of original hypotheses completed; **analyses
of AChE-R presented today**

OVERVIEW OF **ORIGINAL** ANALYSES

• Framework for research questions: Are pertinent factors
   associated with enzyme levels?

• Factors studied:
   - standardized testing for anxiety/mood disorders
   - deployment status re: service in Persian Gulf
   - Gulf War Veterans Illness (GWVI)

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FORMAT OF ORIGINAL ANALYSES

• Multiple linear regression analyses conducted with enzyme
   levels assigned as outcome variables; results presented
   as predicted least square mean values (nmol/min/ml)

• Models adjusted for age, body-mass index, smoking,
   acute illness, antidepressant medications, alcohol/drug
   use, case-control status in Iowa study

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FINAL STUDY SAMPLE FOR ORIGINAL ANALYSES

| | |
|---|---|
| Wave II participants: | 602 |
| • serum not available | - 25 |
| Study population: | 577 |
| • non-white or female veterans | - 89 |
| • incomplete questionnaire data | - 12 |
| Final analytic sample: | 476 |

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SUMMARY OF ORIGINAL ANALYSES

• Anxiety/mood disorders not associated with enzyme levels

• Deployment status not associated with enzyme levels

• GWVI symptoms not associated with enzyme levels

OVERVIEW OF **CURRENT** ANALYSES

• Framework for research questions: Are pertinent factors
  associated with AChE-R levels?

• Factors studied:
  - standardized testing for anxiety/mood disorders
  - deployment status re: service in Persian Gulf
  - Gulf War Veterans Illness (GWVI)
  - self-reported exposures among deployed veterans

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GULF WAR VETERANS ILLNESS

Pertinent symptoms reported at Wave I or II were linked
  to CDC criteria for GWVI (e.g., involving 2 of 3 axes
  re: mood-cognitive, fatigue, musculoskeletal symptoms)

GWVI: Definition 1 - onset of symptoms after Gulf War,
  present at Wave II, regardless of status at Wave I;
  Definition 2 - onset after Gulf War, present at Wave I
  and Wave II (subset with longer duration of symptoms)

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FORMAT OF CURRENT ANALYSES

• Multiple linear regression analyses conducted with AChE-R
  levels assigned as outcome variables; results presented
  as predicted least square mean values (normalized
  Karnovski arbitrary units)

• Models adjusted for age, body-mass index, smoking,
  acute illness, antidepressant medications, alcohol/drug
  use, case-control status in Iowa study

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FINAL STUDY SAMPLE FOR CURRENT ANALYSES

| | |
|---|---|
| Original study population: | 577 |
| • serum not available | - 321 |
| Current study population: | 256 |
| • non-white or female veterans | - 38 |
| • incomplete questionnaire data | - 4 |
| Final analytic sample: | 214 |

VETERANS WITH AND WITHOUT ACHE-R ASSAYS

AChE-R available:

| Characteristic: | Yes (N=256) % | No (N=321) % |
|---|---|---|
| • male sex | 88% | 87% |
| • mean age | (39 years) | (39 years) |
| • mean body mass index | (29) | (29) |
| • deployed | 73% | 71% |
| • GWVI definition 1 | 66% | 61% |
| • GWVI definition 2 | 36% | 32% |

RESULTS OF LABORATORY ASSAYS

Measurement of AChE-R for 256 veterans:

| | |
|---|---|
| Range | 0-106 |
| Median | 39 |
| Mean | 42 |
| Standard deviation | ±21 |

*[OTHER TABLES BEING CHECKED*

*PRIOR TO PUBLICATION]*

SUMMARY OF CURRENT ANALYSES

• Deployment to Persian Gulf not associated with AChE-R

• Symptoms of Gulf War Veterans Illness not associated
   with AChE-R

• Data regarding self-reported exposure and AChE-R limited
   (e.g., alpha-level not adjusted for multiple comparisons;
   very low frequency of non-exposed is "unstable" result)