Memory test

RESULTS

Materials

- Memory test: 3 lists of 24 words each, given on 3 consecutive days. Cues: first 2 letters of all words. Encoding task: formulating a sentence with each word.

METHODOLOGY

Participants

- Newly diagnosed patients (N=5): evaluated before treatment.
- Cancer survivors (N=10): evaluated 6 months to 5 years post-treatment.
- Young participants (mean age=23), treated for lymphoma or sarcoma with a range of drugs, including doxorubicin.
- Controls (N=15): individually matched.
- Children with acute lymphoblastic leukaemia with a mean age of 10.
- Women with breast cancer with a mean age of 50.

Problems of previous studies:

- Women with breast cancer with a mean age of 50.
- Children with acute lymphoblastic leukaemia with a mean age of 10.

Our study aims to create a setting for the description of neuro-cognitive mechanisms involved in chemotherapy-induced memory problems.

Neuropsychological test

- New patients: impaired on spatial memory, figure learning, and make more errors in attention and information processing tasks.
- Survivors: impaired on story memory, spatial immediate and delayed memory, list and figure learning, attention, executive functioning, and information processing. They make more errors than controls.
- Survivors: higher distress, mental fatigue than controls and new patients.
- New patients: lower quality of life, functioning, higher physical fatigue and perceive that the illness will last longer and have lower control over it, compared to both survivors and controls.
- Results not significant for memory malingering, working memory, visual recognition memory, and subjective cognitive complaints.

Neuropsychological battery: Wechsler Test of Adult Reading, D2, Stroop, Test of Memory Malingering, Bort Memory and Information Processing Battery, Digit span, Controlled Oral-Word Association, Delis-Kaplan Executive Functions.

SELF-Assessment questionnaires: EORTC-Info and Quality of life, Hospital Anxiety and Depression Scale, Illness Perceptions Questionnaire, Subjective cognitive complaints questionnaire, Fatigue Scale.

RESULTS

New patients: slower encoding, enhanced forgetting, impaired retrieval.

Memory test

- Encoding = Learning curve in new patients (Fig. 2, F=68.8, p<0.001) and survivors (Fig. 4, F=3.3.3, p<0.001).
- Consolidation = Forgetting slope in new patients (Fig. 4, F=80.6, p<0.001) and survivors (Fig. 5, F=71.08, p<0.001).
- Retrieval = Benefits of cues in new patients (Fig. 6, F=68.81, p<0.001) and survivors (Figure 7, F=28.79, p<0.001).

CONCLUSIONS

- Encoding, consolidation, and retrieval data suggests a medial-temporal involvement of the memory impairments.
- Memory problems are observed before treatment, are enhanced by it and do not cease up to 5 years post-treatment.
- The enhanced number of errors without a clear attention impairment suggests a pre-frontal involvement.

More research is needed to continue describing their mechanisms, links, and create suitable prevention and intervention strategies. These problems are not linked to distress, quality of life, or fatigue measures. Results should be interpreted in the light of a small sample size.

Table 1. Means and standard deviations of differences in cognitive functions between newly diagnosed patients, survivors, and their matched controls. Results in blue boxes are significant for p<0.05.

Test | New (m/sd) | Controls (m/sd) | Survivor (m/sd) | Control (m/sd)
--- | --- | --- | --- | ---
Story Immediate | 29.4 (6.8) | 29.3 (14.5) | 19.8 (6.8) | 36.0 (9.2)
Story Delayed | 27.4 (7.1) | 27.3 (11) | 17.5 (7.3) | 27.8 (7.4)
Spatial Copy | 71.9 (15.3) | 84.2 (5.2) | 77.4 (12.5) | 89.7 (7.8)
Spatial Immediate | 71.9 (15.3) | 90.9 (8.3) | 76.2 (12.5) | 79.9 (20.7)
Spatial Delayed | 65.9 (6) | 69.9 (7.2) | 65.5 (20) | 73.5 (20.5)
List learning | 37.7 (1) | 64 (5.6) | 37.7 (1) | 61.4 (7.7)
Word recognition | 28.2 (1) | 29 (9) | 28.7 (3.3) | 29.3 (1)
Figure learning | 39.4 (3.3) | 42 (3.6) | 41.3 (4.5) | 43.2 (5.1)
Figure intrusions | 4.2 (6.6) | 4 (5.3) | 4.1 (4.1) | 3.3 (3.3)

Attention tests

- Attention Total | 408.5 (29.3) | 471.7 (113) | 467.4 (111.9) | 472.8 (56.7)
- Concentration | 168.9 (23.7) | 154 (55) | 175.5 (59.1) | 185 (21)
- Attention % Errors | 25.3 (12.3) | 10 (7.9) | 15.1 (10) | 15 (15.2)

Executive functions

- Stroop Interference | 49.6 (6.8) | 57 (11.9) | 58.6 (5.6) | 57.6 (7.9)
- COWA F | 10 (3.2) | 10.7 (4.7) | 13.3 (4.7) | 17.3 (3.4)
- COWA A | 9.4 (5.6) | 12.7 (8.5) | 21.3 (7.8) | 13.7 (2.5)
- COWA S | 15.4 (4.3) | 15.7 (8.5) | 16.1 (3.1) | 18.8 (4.6)
- COWA Categories | 20.2 (7.4) | 25 (8.5) | 22.3 (4) | 25.6 (5.8)
- D-KEFS Switch | 9.4 (6.5) | 9.2 (6.1) | 4.4 (4) | 8.4 (2.7)

Information processing tests

| IP | Total | 614.9 (7) | 73 (24.4) | 72.2 (18) | 68.4 (3.3)
| IP | Speed | 61.4 (7.9) | 62.9 (10) | 64.7 (11.7) | 72.2 (28.8)
| IP | Errors | 3.5 (4.3) | 3.1 (1.1) | 2.1 (17.7) | 1.9 (1.8)

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