Letters to the Editor

[The Editor is not responsible for the views expressed by the correspondents]

Association between Sleep Quality and Different Aspects of Memory along with Assessment of Post Exercise and Post Meditation Effects

Sir, — Recently I read the Original Article, titled "Association between Sleep Quality and Different Aspects of Memory along with Assessment of Post Exercise and Post Meditation Effects" by Mohita Singh, *et al*[1]. The study was done in two phases. In the first phase they have assessed different components of sleepquality and memory thoroughly by using Pittsburgh sleep quality index and PGI memory test respectively. Based on memory scores, both male and female subjects were divided into five groups like, excellent, above average, average, below average and low level of memory. Various sleep quality components were studied in these memory groups. The finding was very interesting that memory scores were improved with better sleep quality in both males and females.

This study has reported that women have better sleep quality compared with men and various previous studies also have reported the same[2]. In the second phase of this study, they have divided both the male and female subjects into two groups and studied the effects of moderate intensity exercise and meditation on both sleep and memory. In this phase also they have reported that there was improvement in sleep quality and memory scores in both males and females after exercise and meditation interventions.

In today's competitive World psychological problems are increasing and various studies have shown that daily meditation can help in enhancing attention, memory and mood[3]. Some studies have reported that lack of sleep in middle age may increase risk of dementia[4,5].

This study will be very helpful to the society, as its not only reporting that sleep quality and memory are interrelated but also proved that moderate intensity exercise and meditation will help in improving sleep quality and memory. But in the second phase of the study, if they would have divided both males and females in five groups on levels of memory like phase one and studied the effects of these interventions in each group separately, we would have got clear idea about whether moderate intensity exercise and meditation can improve memory directly or it has positive effect on sleep quality which in turn improves memory.

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Successful Use of Total Parenteral Nutrition in Patients with Paraquat Poisoning

Sir, — Paraquat (1,10-dimethy l-4, 40-bipyridinium dichloride) is an effective, nonselective herbicide that is widely used in many parts of India. It is also the most frequently used herbicide in the rural part of West Bengal. Dermal or spray exposure generally causes limited, localised injury, whereas intentional ingestion of this compound for suicide has an extremely high case fatality rate[1]. A paraquat dose of 30mg/kg may be fatal which is equivalent to 7-8 mL of the 24.6% solution sold commercially[2]. This compound is absorbed by the intestine and accumulates inside the cells of different organ where it undergoes redox cycling and the production of Reactive Oxygen Species (ROS). Which results in subsequent inflammatory responses mediated by various inflammatory cytokines such as Interleukin (IL)-1, IL-6, IL-8, tumour necrosis factor (TNF)-a, TNF-b, interferon-1, transforming growth factor (TGF)-b and nuclear factor (NF)-kappa b[3]. Clinical features include oral ulceration with gastro-intestinal tract injury, acute kidney injury, acute lung injury (subsequently progressive pulmonary fibrosis), acute liver failure, metabolic acidosis and leucocytosis. Till now, there has been no effective targeted antidote for paraquat poisoning. Many centres have tried a combination of cyclophosphamide, steroids, antioxidants, charcoal haemoperfusion and early haemodialysis[4]. But still, the case fatality rate is very high.

Clinically, most patients with paraquat poisoning who have excessive upper GI mucosal injury have been found to develop feeding difficulties and Total Parenteral Nutrition (TPN) is needed to reduce nutritional deficit. Studies have shown previously about the beneficial role

of ω-3 fish oil containing TPN as an anti-inflammatory agent in the case of paraquat poisoning (decreases 4-series leukotrienes and increases production of anti-inflammatory cytokines like TGF-β)[5]. Based on the above findings, we have used TPN (peripheral) both as pharmacological and nutritional therapy in two patients with paraquat poisoning, with very good early recovery.

Case 1 : A 21-year-old female presented to the emergency room (Day 3) with a history of paraquat ingestion (approx 20ml) two days earlier. Clinical examination has revealed extensive oral mucosal ulceration and icterus. On admission, her renal and hepatic functions were altered, her total leucocyte count was elevated (Table 1) and her urine output was also reduced. Based on KDIGO guidelines for acute kidney injury, haemodialysis was initiated on day 4. Total parenteral nutrition (1000 mL) supplementation was initiated on day 5. On days 6, 8, and 10, three episodes of dialysis were given. From day 8 onward, the patient's renal functions had started to improve along with increased urine output. On days 9 and 12, two more units of TPN (1000 mL) were given. Subsequently, all the haematological and biochemical parameters had improved. We had discharged the patient on day 17 with an almost normal renal function and liver function report (Table 1).

Table 1 — *Comparison between hematological and biochemical parameters of Patient 1 on Day3, Day 8,Day14 and Day 17 (discharge day)*

Parameters	Day 3	Day 8	Day 14	Day 17
Hemoglobin	10.6	9.8	10.5	11.0
TLC	23,300	13,900	11,200	10,200
Urea	169	105	76	36
Creatinine	6.1	3.6	2.1	1.2
Total Bilirubin	4.6	3.0	2.6	1.4
ALT	345	123	99	56
AST	258	97	56	33

Case 2 : This 28-year-old male was referred to our institution from the nearest sub-divisional hospital with altered sensorium and acute kidney injury. He had taken paraquat poison (>15 mL) 6 days prior, according to his history. At the sub-divisional hospital, the patient had undergone 2 episodes of haemodialysis. After admission (Day 7), his renal function and liver function were found to be abnormal (serum creatinine 17 mg/dl and total bilirubin 12.5 mg/dl). Haemodialysis was restarted, and as in a resource-poor setting, alternate-day dialysis was given. We had transfused 4 units of total parenteral nutrition (1000 mL) along with 3 units of blood transfusion in between alternate-day dialysis. A total of 16 episodes of haemodialysis were given. Patient's condition started improving from day 21, and he was discharged after 32 days of admission with normal renal and liver functions. The gradual changes are depicted in Table 2.

Table 2 — *Comparison between hematological and biochemical parameters of Patient 2 on Day 7, Day 14, Day 21, Day 28, Day 35 and Day 39 (discharge day)*

Parameters	Day 7	Day 14	Day 21	Day 28	Day 35	Day 39
Hemoglobin	7.8	8.3	9.5	9.1	10.5	11.1
TLC	26700	19800	12000	16500	13000	9800
Urea	257	198	166	110	67	42
Creatinine	17	15.3	11.8	8.7	3.5	1.4
Total Bilirubin	12.5	11.2	9.7	6.5	3.3	1.8
ALT	356	234	200	156	99	66
AST	455	266	213	177	105	78

From the above-mentioned data, it is evident that both patients improved despite having AKI and acute liver failure on presentation. The first patient required fewer amount of hemodialysis with early recovery as she had presented early. In spite of her relatively late presentation, the second patient also survived. One possible explanation may be that patient had received large quantities of antioxidant molecules through total parenteral nutrition, which had reversed the detrimental oxidative damage caused by paraquat and its metabolites .Early haemodialysis is therapeutic option for the paraquat poisoning patients as per literature but in our patient, dialysis was given as a supportive care.Urine paraquat level can not be measured in this resource poor settings, proof of direct improvement after TPN therapy cannot be elicited. Thus, further studies are needed to find the definitive therapeutic roles of TPN in cases of paraquat poisoning.

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Are Deep Learning Algorithms Changing the Landscape of AI-Assisted LV-GLS Analysis in Cardiology, Offering Hope for Early Disease Detection?

Sir, — The fusion of Artificial Intelligence (AI) and Deep Learning (DL) in cardiology, particularly in Left Ventricular Global Longitudinal Strain (LV-GLS) analysis via echocardiography, heralds a transformative epoch in cardiac healthcare[1]. This integration promises to reshape cardiac healthcare by revolutionizing early detection, risk assessment, and therapy evaluation, offering substantial benefits for patients and healthcare providers.

The heart, a vital yet vulnerable organ, necessitates timely detection and intervention in conditions like heart failure and myocardial infarction. Traditionally, LV-GLS measurement involved manual calculations and subjective interpretations, leading to delayed diagnoses and inconsistent results. The advent of AI-driven LV-GLS analysis powered by DL has revolutionized this approach. DL, a subset of AI, harnesses artificial neural networks to independently process intricate patterns within datasets, significantly augmenting the precision and efficiency of cardiac evaluations.

This groundbreaking technology provides precise and consistently reliable LV-GLS measurements, even in nuanced cases of cardiac dysfunction. AI empowers independent acquisition of pattern combinations within datasets, enhancing standard section identification of cardiac anatomical structures, automatic recognition, and segmentation of cardiac structures, expediting disease diagnosis[2]. Leveraging neural networks and extensive datasets, DL algorithms process and analyze LV-GLS data with remarkable precision and speed, performing specific tasks in echocardiographic image analysis such as view classification, time to events, and image segmentation[3].

Automating LV-GLS analysis accelerates processes, freeing healthcare professionals to focus on the art of medicine and patient care rather than manual calculations. Furthermore, fully automated strain measurements rooted in DL hold the promise of reducing manual intervention while significantly enhancing result reproducibility. The rapid processing speed of these learning-based algorithms opens the door to conducting real-time on-screen measurements during image capture[4]. Such heightened precision is invaluable for early detection and diagnosis, saving time and streamlining patient care while extending the reach of advanced cardiac diagnostics across diverse healthcare settings.

AI pipelines' ability to categorize cardiac views, time cardiac events, track myocardium, and swiftly measure GLS allows for early detection of cardiac dysfunction, offering a critical intervention window[4]. These systems analyze vast data, yielding deeper insights into cardiac function and cardiovascular health factors, ultimately enhancing patient outcomes and curbing healthcare costs. This collaboration fuels ongoing research, spurring innovation in cardiology and driving the development of groundbreaking diagnostic tools and treatment strategies.

Nevertheless, while AI-driven systems hold great promise, challenges persist, such as the absence of a universally accepted gold standard for LV-GLS measurements and issues regarding model generalizability across different institutions. Ethical considerations surrounding data privacy, transparency, and accountability are paramount to ensure the responsible and ethical utilization of AI technologies[5].

In conclusion, the integration of AI-assisted LV-GLS analysis signifies a pivotal advancement in cardiology, offering a promising future for patients and healthcare professionals alike. This technological leap not only enhances the precision and efficiency of LV-GLS measurements but also holds the potential to reshape cardiac healthcare by enabling earlier detection and more accurate diagnoses. Collaborative engagement among medical practitioners, researchers, regulators, and the public is crucial to responsibly harness these innovations, ushering in an era of improved cardiac healthcare and enhanced patient well-being.

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