Cancer and Virtual Reality Vr, The Great Challenge Of The Century

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Introduction

The number of new cases of cancer is constantly increasing around the world. The lengthening of life expectancy and therefore the aging of the population largely explain this increase in the number of cancers, in particular (prostate cancer in men, breast cancer in women, colorectal or gastric cancers).The diagnosis, the associated treatments as well as the more or less long-term sequelae represent a multitude of stressful situations. It has thus been shown that more than 10% of patients treated for cancer present the clinical symptoms of an anxiety disorder (Medling, 2005) and this prevalence reaches nearly 17.6%, in patients living with cancer for more than two years (Riener & Harders, 2012).

Virtual reality is a therapeutic aid, but it also has its place in the training of doctors in oncology and in cancer diagnosis. Medical oncology as a whole and virtual reality have a promising future.

Virtual reality for patients

Virtual reality has found its place with patients as a therapeutic aid. For a large number of pathologies, such as cancer, it is used because it is a revolutionary technology but above all gentle and without side effects. VR refers to the interactions between an individual and a computer-generated environment stimulating multiple sensory modalities, including visual, or auditory experiences, The user's perception of reality is facilitated by the use of headsets (HMD, in glasses or helmets), (Fig. 1).

Figure 1 : VR virtual reality headset

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To fight the pain

VR is the most useful and used in this area. In developed countries, many oncology departments use virtual reality to help their patients fight against pain related to the disease or following a biopsy.

Almost half of hospital patients experience pain, a quarter of which is considered "unbearable" (Turk et al., 2011). The treatment of pain has traditionally been based on pharmacological management, including opioids, which can give inconsistent and suboptimal results. Therapeutic virtual reality (VR) has become an effective and non-pharmacological treatment modality for pain (Turk et al., 2011; Shah et al., 2017). VR users wear a head-mounted display with a proximity screen that creates a feeling of being transported to realistic three-dimensional worlds (Fig. 1-2).

A proposed mechanistic theory of VR suggests that by stimulating the visual cortex while engaging other senses, VR acts as a distraction to limit the user's processing of nociceptive stimuli (Dascal et al., 2017).The ubiquity of high performance mobile computing has now reduced both the size and cost of virtual reality devices, enabling its use in everyday clinical environments. To date, VR has been used in many clinical settings in oncology, to help treat anxiety disorders, control pain, support physical rehabilitation, and distract patients during chemotherapy, (Turk et al., 2011; Dascal et al., 2017) Of Likewise, VR reduces pain and provides positive distraction during procedures, such as intravenous line placements (Dascal et al., 2017).

Figure 2: virtual reality for pain relief in hospitals

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To better manage a hospitalization

VR is indeed an ideal tool to help adult patients and children to fight against stress but also trouble for chemotherapy sessions, it is a technology that will help them keep morale during these sessions.

Several controlled VR trials in hospitals have been published in the last 10 years:

BOARD: Studies using virtual reality (VR) as a tool to improve medical conditions

APPLICATION	AUTHOR (YEAR)	EQUIPMENT	PARTICIPANTS	DESIGN	RESULTS/ EFFICIENCY	SECONDARY O observations	MEAN Quality
Eating disorders/ Obesity	Cesa et al (2013)	Software; showing the virtual Environments +2 Body image Comparisons.	N=90 women with Binge eating Trouble (LIT) at Rehabilitation center	Random assignment: (N = 31 TCC + VR, n = 30 CBT, n = 29 usual inpatient care regimens	Body image issues (BIAQ) improvement and helps with weight loss in CBT + VR Uniquely ; globally Body enhancements Satisfaction (BSS and CDRS) under the 3 conditions	34.6% of patients dropped out after one year of follow-up; Increased weight gain In all 3 after 1 year	0.85

Eating disor-ders/ Obesity	Manzoni et al (2009)	HMD: RV called Green Valley Psychologists as-ked Participant in imagining an environment Similar.	N = 60; adult female Patients hospi-talized with Weightloss	Relaxation workouts Sessions (4 per week) over 3 weeks ei-ther with RV, traditio-nal imagina-tion treatments, or standard hospital care	At 3 months of fol-low-up: With RV /Relaxa-tion training condi-tions (RV and Ima-ginative) helped re-duce emotional ea-ting (WELSQ; EOQ), anxiety (STAI), Depressive symp-toms (BDI); impro-vements in self-ef-ficacy (WELSQ)	Not applicable	0.87
Cognitive and motor Rehabilitation	Larson et al (2011)	VRROOM: a 3-D Patients see vir-tual objects supe-rimposed on a Real world	N = 18; pa-tients with Traumatic brain Injury (TCC) 1973 years Hos-pitalized patient	Treatment (with 12 Four-minute trials)	Memory Impro-vements Proces-sing with haptic cues helped im-prove perfor-mance vs. when The clues were not present	3 participants dropped out due to fatigue and eye pain	0.85
Pain distraction	Li et al 25 (2011)	PlayMotion Sys-tem Without HMD; vi-deo Projectors capture Body movements and transforms Walls at stake	(8-16 years old) With cancer in pediatric oncology Hong Kong;	Pre- / post-test between subjects Design; 30 minutesjhad therapeutic	Less depressed Symptoms in the experimental group after 1 week	Not applicable	

For cancer patients in palliative care

Virtual reality is indicated for anxious patients:

There are many anxiety-generating situations in palliative care (announcement of disease progression, care, chemotherapy sessions, radiotherapy, etc.) Often linked to anxiety attacks, the associated pains wake up or are increased. The use of headphones could therefore soothe these patients by diverting their attention, and thus reduce the pain crisis.

The virtual reality headset can help prevent pain

Linked to certain treatments (installation of a peripheral venous route, Huber needle, indwelling catheter, carrying out blood gases, etc.) and during the repair of complex dressings (dilapidated, very painful tumor wounds, sources of anxiety, etc.).

This device can be used in addition to the usual therapies

Like anxiolytics, neuroleptics or analgesics. It may also be of interest for patients who are resistant to taking medication.

Figure 3: the virtual reality headset decreases the anxiety of the intensive care patient Healthy / mind 05/10/2021

To train doctors

For medicine

Its use in the field of health has focused on technical and educational applications (eg, preparation for surgery through simulations of surgical acts, medical evaluations), but also in therapeutic management - known as therapy by VR exposure

- of certain pathologies such as cancer, anxiety disorders, psychosis, and certain forms of depression) (Bin et al., 2020; Chirico et al., 2016).

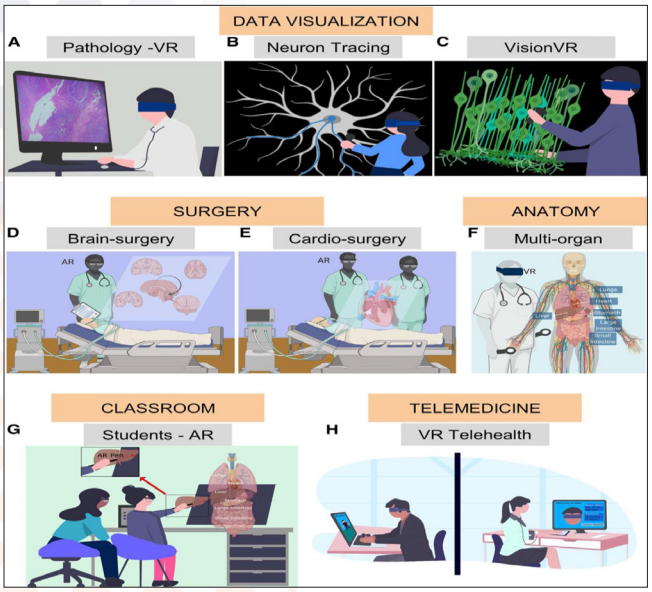

Figure 4: Virtual reality and augmented reality-based visualization of scientific experimental imaging data, tools for surgery and anatomy, and collaborative interfaces for education and telehealth [7].

For virtual training of surgeons and biomedical devices

Surgeons require specific skills requiring extreme practice and dedicated training, but this process can be difficult for medical trainees. Virtual reality offers students the opportunity to perform a low-risk procedure before performing surgery on an individual to resolve this problem.

Students develop skills such as on-site thinking, problem-solving in a hands-on environment, and performing tasks in a stressful environment. Virtual reality-based training has unique advantages. VR makes it easier to work with various deep organs that may be physically obstructed by others and, therefore, difficult to observe during conventional surgical training

VR can be used as a training approach to transfer procedural knowledge in the biopharmaceutical industry, replacing traditional reading of long manuals (Chirico et al., 2016).

Experiential biomedical education tools for teaching

Virtual reality enhances the learning experience of students by teaching new concepts of molecular biology in cancerology (Bin et al., 2020; Chirico et al., 2016). For a generation living a digital lifestyle, attention span has dramatically decreased thanks to media technologies (Riener, 2012; Helfand et al., 2009; Turk et al., 2011; Shah et al., 2017; Dascal et al., 2017; Bin et al., 2020) . VR as an educational tool offers feasible digital solutions to this problem as students focus on a virtual space where distractions are greatly reduced. One approach to using virtual reality in classrooms is to provide students with headsets synchronized with a central device to experience the same content. It can also be decentralized, where medical lessons take place in a virtual classroom with students wearing VR headsets and logging in from different locations.

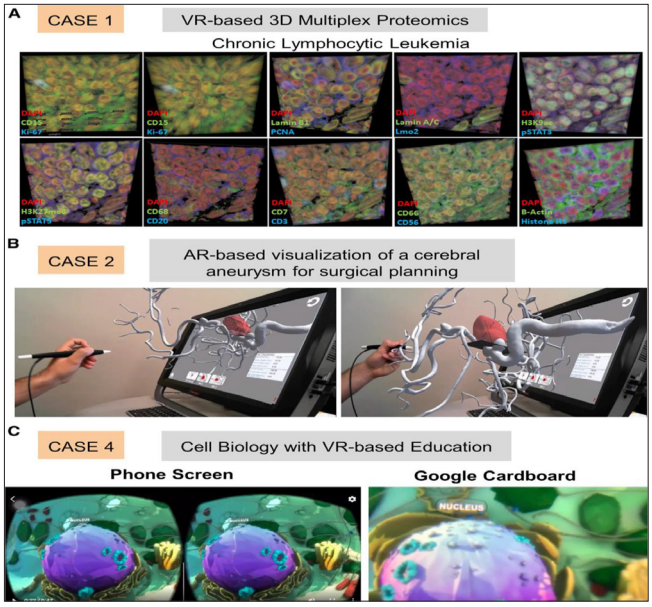

Figure 5: Case studies using virtual reality and augmented reality [7].

Conclusion

Virtual reality (VR) is revolutionizing the world around us, the use of VR in oncology is today a practice that is increasingly considered by healthcare teams, It is highly interactive, flexible, tailored to the individual, and applicable to people of different ages, genders, and health. As technology improves and costs are reduced, virtual reality will undoubtedly shape the future of cancer care.

References

1. Medling. (2005). Uses of Virtual Reality in Healthcare: It's Almost Done. *Biomed instrum technol; 39*: 16-18.

2. Riener, R., Harders, M. (2012). Virtual reality in medicine (1st ed.). London: *springer, 1*(2), 294 / 299. DOI:10.1007/978-1-4471-4011-5

3. Helfand, M., & Freeman, M. (2009). Assessment and Management of Acute Pain in Adult Medical Inpatients: A Systematic Review. *Pain medicine (Malden, Mass), 10*(7),1183-99.https://doi.org/10.1111/j.1526-4637.2009.00718.x

4. Turk, D.C., Wilson, H.D., & Cahana, A. (2011). Treatment of chronic non-cancer pain. *Lancet, 377*(9784), 2226-35. https://doi.org/10.1016/S0140-6736(11)60402-9

5. Shah, A., Hayes, C.J., & Martin, B.C. (2017). Factors influencing long-term opioid use among opioid naïve patients: an examination of initial prescription characteristics and pain etiologies. T*he Journal of Pain: Official Journal of the American Pain Society, 18*(11), 1374-83. DOI: 10.1016/j.jpain.2017.06.010

6. Dascal, J., Reid, M., IsHak, W. W., Spiegel, B., Recacho, J., Rosen, B., Danovitch, I. (2017). Virtual reality and hospitalized patients: a systematic review of randomized controlled trials. *Innov Clin Neurosci, 14*(1-2), 14-21. Retrieved from https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC5373791/pdf/icns_14_1-2_14.pdf

7. Bin, S., Masood, S. and Jung, Y. (2020). Virtual and augmented reality in medicine. In Feng D. D. (2nd ed.), *In Biomedical Information Technology* (Academic press) (pp. 673-686). Elsevier.

8. Chirico, A., Lucidi, F., De Laurentiis, M., Milanese. C., Napoli, A., & Giordano, A. (2016). Virtual reality in health system: beyond entertainment. A mini review on the efficacity of VR during cancer treatment. *J Cell Physiol, 231*(2), 275-87. DOI: 10.1002/jcp.25117.