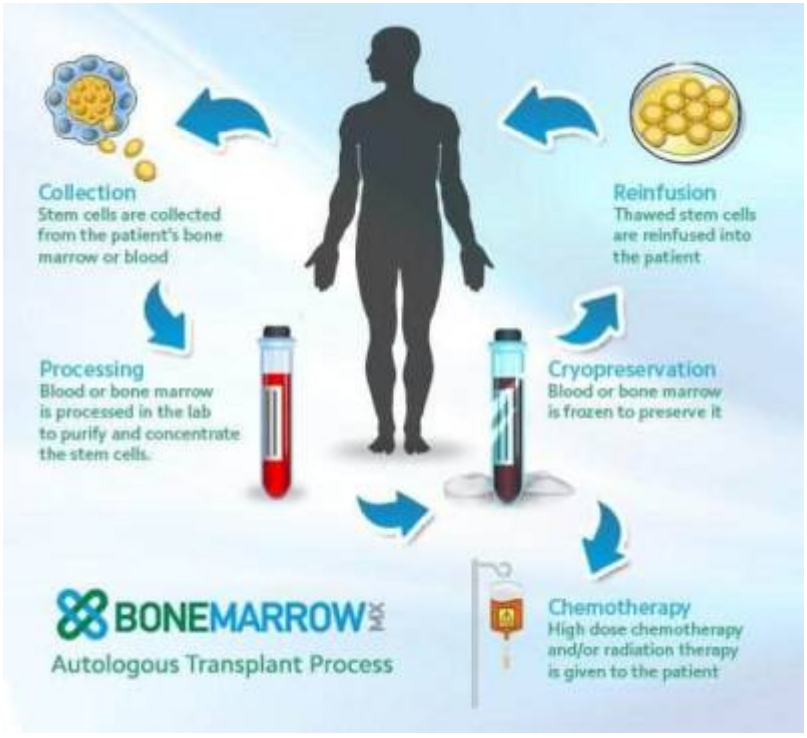
High dose chemotherapy and autologous stem cell transplantation



Pediatric intracranial tumor outcome has improved for last a few decades. However, the prognosis remains dismal in patients with recurrent brain tumors. The outcome for infants and young children in whom the use of radiotherapy (RT) is very limited because of the unacceptable long-term adverse effect of RT remains poor. The prognosis is also not satisfactory when a large residual tumor remains after surgery or when leptomeningeal seeding is present at diagnosis. In this context, a strategy using high-dose chemotherapy and autologous stem cell transplantation (HDCT/auto-SCT) has been explored to improve the prognosis of recurrent or high-risk brain tumors. This strategy is based on the hypothesis that chemotherapy dose escalation might result in improvement in survival rates. The efficacy of tandem HDCT/auto-SCT has been evaluated in further improving the outcome. This strategy is based on the hypothesis that further dose escalation might result in further improvement in survival rates. At present, the number of studies employing tandem HDCT/auto-SCT for brain tumors is limited. However, results of these pilot studies suggest that tandem HDCT/auto-SCT may further improve the outcome [1)].

Although tandem HDC/auto-SCT with topotecan-thiotepa-carboplatin and melphalan-etoposide-carboplatin regimens showed promising survival rates, treatment modifications are warranted to reduce toxicities. The survival rates with relapsed brain tumors were unsatisfactory despite HDC/auto-SCT, and further study is needed [2)].

In 2005, the role of high-dose chemotherapy with autologous stem cell transplantation was explored in different ways: High-dose chemotherapy given in all patients as proposed in the Head Start protocol. High-dose chemotherapy given in relapsing patients as salvage treatment in the French

strategy. In the earliest trials, the same therapy was applied to all histological types of malignant brain tumors and whatever the initial extension of the disease. This attitude was justified by the complexity of the classification of all brain tumors that has evolved over the past few decades leading to discrepancy between the diagnosis of different pathologists for a same tumor specimen. Furthermore, it has become increasingly obvious that the biology of brain tumors in very young children is different from that seen in older children. However, in the analysis of these trials an effort was made to give the results for each histological groups, according to the WHO classification and after a central review of the tumor specimens. All these collected data have brought to an increased knowledge of infantile malignant brain tumors in terms of diagnosis, prognostic factors and response to chemotherapy. Furthermore a large effort was made to study long term side effects as endocrinopathies, cognitive deficits, cosmetic alterations and finally quality of life in long term survivors. Prospective study of sequelae can bring information on the impact of the different factors as hydrocephalus, location of the tumor, surgical complications, chemotherapy toxicity and irradiation modalities. With these informations it is now possible to design therapeutic trials devoted to each histological types, adapted to pronostic factors and more accurate treatment to decrease long term sequelae [3].

Case series

High dose chemotherapy and autologous stem cell transplantation case series.

References

1)

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2)

Choi JY, Kang HJ, Hong KT, Hong CR, Lee YJ, Park JD, Phi JH, Kim SK, Wang KC, Kim IH, Park SH, Choi YH, Cheon JE, Park KD, Shin HY. Tandem high-dose chemotherapy with topotecan-thiotepa-carboplatin and melphalan-etoposide-carboplatin regimens for pediatric high-risk brain tumors. Int J Clin Oncol. 2019 Jul 27. doi: 10.1007/s10147-019-01517-8. [Epub ahead of print] PubMed PMID: 31352632.

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