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Sentinel node imaging methods. Evaluate diagnostic value of the study

Metody obrazowania węzła wartowniczego. Ocena wartości diagnostycznej badania

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Keywords: sentinel node, lymphoscintigraphy, cervical cancer, breast cancer, malignant melanoma.

Słowa kluczowe: węzeł wartowniczy, limfoscyntygrafia, nowotwór szyjki macicy, nowotwór piersi, czerniak złośliwy.

Abstract

Admission

Lymphoscintigraphy is a universally used method of the visualisation of the guard knot which is the first lymph glands on the road of rafting of lymph from the cancerous focus. The work contains the description of three methods of depicting the guard knot. Dye method applied in lymphoscintigraphy was introduced on the example of cancer of the cervix, isotopic method - of malignant melanoma, associated method dye-isotopic on the example of the breast cancer. Possibility of the application lymphoscintigraphy to the purpose of the marking lets the location of the guard knot avoid making total limphoadenectomia.

Purpose

Presenting methods of depicting the guard knot in limfoscyntygrafii on the example of cancer of the cervix, malignant melanoma and breast cancer. Evaluation of the diagnostic value of the test.

Materials and methods

Using keywords: guard knot, limfoscyntygrafia, cancer of the cervix, malignant melanoma, breast cancer bibliographical Medline bases, Scopus, DynaMed, the Web were searched of Science.

The summary and conclusions

On the example of chosen cancers three methods of depicting the guard knot were described. The work contains a thorough description of the way of performing the test limfoscyntygraficznego and radiopharmaceuticals applied for that purpose. The test is marked relatively by a high sensitivity. The degree of the progress of metastasizing cancers can so be a road of lymphatic vessels determined by depicting the guard knot. This way of diagnostics outweighs in the course of making right decisions in relation to the further course of treatment of the patient.

Streszczenie

Wstęp

Limfoscyntygrafia jest powszechnie stosowaną metodą wizualizacji węzła wartowniczego, który jest pierwszym węzłem chłonnym na drodze spływu chłonki z ogniska nowotworowego. Praca zawiera opis trzech metod obrazowania węzła wartowniczego. Metoda barwnikowa stosowana w limfo scynty grafii została przedstawiona na przykładzie nowotworu szyjki macicy, metoda izotopowa – czerniaka złośliwego, metoda skojarzona barwnikowo-izotopowa na przykładzie nowotworu piersi. Możliwość zastosowania limfoscyntygrafii w celu oznaczania lokalizacji węzła wartowniczego pozwala uniknąć wykonywania totalnej limfadenektomii.

Cel. Przedstawienie metod obrazowania węzła wartowniczego w limfoscyntygrafii na przykładzie nowotworu szyjki macicy, czerniaka i nowotworu piersi. Ocena wartości diagnostycznej badania.
Materiały i metody. Posługując się słowami kluczowymi: *węzeł wartowniczy, limfoscyntygrafia, nowotwór szyjki macicy, czerniak, nowotwór piersi* przeszukano bazy bibliograficzne *Medline, Scopus, DynaMed, Web of Science.*
Podsumowanie i wnioski. Na przykładzie wybranych chorób nowotworowych opisano trzy metody obrazowania węzła wartowniczego. Praca zawiera dokładny opis sposobu wykonywania badania limfoscyntygraficznego oraz stosowane w tym celu radiofarmaceutyki. Badanie cechuje się stosunkowo wysoką czułością. Stopień zaawansowania nowotworów dających przerzuty drogą naczyń chłonnych może być więc określany poprzez obrazowanie węzła wartowniczego. Ten sposób diagnostyki ma duże znaczenie w trakcie podejmowania odpowiednich decyzji odnośnie dalszego sposobu leczenia pacjenta.

Admission

Guard knot (Eng. Sentinel lymph node, SLN) it is the first lymph glands on the road of the rafting of lymph from the cancerous focus. [6, 7]. Lymphoscintigraphy is a universally used method of depicting the guard knot. The test shows ducts of the rafting of lymph, determines the location and the presence of lymph glands in various places with reference to the same primary lesion. It lets on of recognizing microtransport. It enables to locate the knot in the way simple and not-burdening the patient. This method is safe for patients and the medical staff performing the test. Marking and removing the guard bun is standard proceedings at sick persons to malignant melanoma, breast cancer, cancer of the cervix, cancer of the penis and cancer of the prostate gland. The work contains the description of three methods of depicting this knot. Dye method applied in limfoscyntygrafii was introduced on the example of cancer of the cervix, isotopic method - of malignant melanoma, associated method dye-isotopic on the example of the breast cancer.

Purpose

Presenting methods of depicting the guard knot in lymphoscintigraphy on the example of cancer of the cervix, malignant melanoma and breast cancer. Evaluation of the diagnostic value of the test.

Materials and methods

Using keywords: guard knot, limfoscyntygrafia, cancer of the cervix, malignant melanoma, breast cancer bibliographical Medline bases, Scopus, DynaMed, the Web were searched of Science.

Result

Depending on the applied method three essential ways of depicting the guard knot exist. A dye method, during which the guard knot or knots contain dye passed before the treatment is the first method. During the isotopic method a radioisotope moves in SLN or other knots. In the course of the treatment in the bun affected by cancer he watches each other higher than remaining knots and tissues surrounding the level of gamma rays. An associated method is the third method dye-isotopic which knots contain dye passed before the treatment or the radioisotope and similarly in gamma rays demonstrate the high level. Below they entered into detailed description of individual manners of the evaluation of the localization of the guard knot.

Isotopic method

The malignant melanoma causes metastasis in the group of regional lymph glands and addition regional. The road of blood vessels is driven by its metastasis to distant organs (liver, lungs, bones, brain) [5]. Cutting the guard knot out and sending it to the histological examination are one of diagnostic methods of the malignant melanoma of the skin. It is made while basic curing surgeon's proceedings are which.

The isotopic method helps to show the dissemination of cancer at sick persons to the malignant melanoma. It is made at using ^{99}mTc of the colloidal sulphide (sulfur colloid) or of plasmatic albumin (nanoalbumon). Passed radiopharmaceutical is intracutaneous into 4 places around the change or the post-operative scar in the dose about total activity 37 MBq. Directly after the injection a dynamic part of the test with which 60 images register with the temporal resolution of 20 seconds within 20 minutes is carried out. Carrying the static part of the test out consists in performing 10 minute's projections after 30, 60 and 120 minutes after passing the radioisotope. Tests

stay gamma cameras carried out at using. Next on the body of the patient marked a shown guard hub stays. They after 2-3 hours from the conclusion of the inspection make śródoperacyjną location of the guard knot with the probe for the detection of gamma rays. Lymph nodes marked and demonstrating the increased activity are removed. Next they are sent to the histological examination [2, 4]. According to Videl-Sicart and wsp. mistakes in the identification can concern 3 % patients [9].

Dye method

Cancer of the cervix spreads mainly locally through the swelling to nearby organs and tissues (rectum, vagina, bladder). It metastasises with absorbent road to lymph glands: exposed cervical, hip outside, hip shared, exposed aortal, inguinal and cervical. Cancer metastasizes with road of blood vessels to distant organs (lungs, bones). The length of surviving sick persons to cancer of the cervix is dependent on filling by the cancerous process the lymphatic system [5].

For the evaluation of the extensiveness of cancer of the cervix a dye method is applied. The tenderness of this method amounts to the 77.4% [10]. It is made with the help of dye which stays passed after showing the vaginal part in endoscopes. Dye (4 ml) is passed superficially doszyjkowo on the border changes, in macroscopically unchanged tissue within one quadrant of the cervix, is passed śródoperacyjnie with technique 4 to hammer (4x1ml). Places of the injection correspond to hours 12, 3, 6, 9. Śródoperacyjną the evaluation of colouring lymph glands is carried out during 10-30 minutes from passing flags into regions of a neoplastic tumour. To the colour blue knots are Wybarwione being cut out and sent to the histological examination [3].

Method dye-isotope

Associated method dye-isotope enables to show changes among others at sick persons to the breast cancer which is the most frequent malignant tumour at women. Frissel and wsp. they assessed, that the biopsy of the guard knot yield resulted untruthfully negative in the 11% [8]. Metastasis entertains with the absorbent road in the first phase regional lymph glands (axillary, near sternalis and subclavian). Metastasis with road of blood vessels are caused in distant organs (bones, liver, lungs, CNS) [5].

The test is performed with the help of the protein nanocolloid tagged ^{99}mTc. Colloidal solution of human albumin is a carrier of isotope. The total activity amounts to doses from 18 to 37 MBq. The isotopic flag is passed in the interstitial injection to the glandular tissue of the breast in 4

places: symmetrically around a neoplastic tumour, intracutaneous above clinically with perceptible tumour or doguzowo (under control ultrasound scan). The time from passing the isotopic flag to the operating treatment can to take out from 3 to 4 or from 20 up to 24 hours. The dye flag is passed 10-15 minutes before commencing the operating treatment in the same way as the isotopic flag. After 3 hours and 30 minutes from passing the isotopic flag a static canvassing is performed with the gamma camera about the great visual field. Next places are located about the increased radioactivity corresponding to lymphatic vessels and lymph glands (axillary, przymostkowym, subclavian). The marked knot is had be marked on the skin with marker. The next stage consists on among operative for situating SLN with the manual detector of gamma rays or the dye flag (bun dyed out to the green-blue colour). Lymph glands are being marked and demonstrating the increased activity removed. Tissue preparation judges itself through searching for lymph glands and the verification of the isotopic activity [1]. After the SLN removal limiting the mobility doesn't act in the glenohumeral joint and there is no risk of the lymphatic edema of the limb.

The summary and conclusions

The work presents three techniques of the location of the guard knot at patients with the breast cancer, cervixes and with malignant melanoma.

Showing lymph glands doesn't equal with diagnosing metastasis, but fixes the possible way of their dissemination. Described tests are marked relatively by a great sensitivity. Mistakes in the identification of the malignant melanoma can concern the 3% of patients [9].

The biopsy of the guard knot yield results untruthfully negative in the 11% while examining patients with the breast cancer [8].

The tenderness of the method depicting knots in cancer of the cervix amounts to the 77.4%.

The test allows for diagnosing micrometastasis. The possibility of applying this method of the marking of the guard knot allows to avoid making total limfadenektomii.

References

1. T. Jastrzębski, 2007, Biopsja węzła wartowniczego w raku piersi: krytyczna ocena i opracowanie algorytmu postępowania dla bezpiecznego wprowadzenia metody do celów klinicznych: rozprawa habilitacyjna, Akademia Medyczna w Gdańsku.

2. R. Gołębiewska, 2005, Limfoscyntygrafia w czerniaku złośliwym z mnogimi drogami spływu chłonki, Problemy Medycyny Nuklearnej, 19; (87-94).

3. D. Wydra, 2008, Ocena wartości oznaczania węzła wartowniczego w stopniu IB-IIA klinicznego zaawansowanego raka szyjki macicy według klasyfikacji FIGI, Akademia Medyczna w Gdańsku.

4. T. Jastrzębski, 2009, Technika oceny lokalizacji węzła wartowniczego w czerniaku umiejscowionym na skórze górnej części pleców, Współczesna Onkologia, 18; (81-84).

5. S. Robbins, 2007, Patologia, Vinay ban & Partner Wrocław (789, 819, 916).

6. B. Birkenfeld, M. Listewnik, L. Nagay, 2011, Medycyna nuklearna i obrazowanie molekularne, Wydawnictwo Pomorskiego Uniwersytetu Medycznego, Szczecin.

7. R.Kordka, 2007, Onkologia: podręcznik dla studentów i lekarzy, Via Medica, Gdańsk (202, 233, 279).

6. B.Pruszyński, B. Benendo-Kapuścińska, 2011, Radiologia: diagnostyka obrazowa Rtg, TK, USG, MR i radioizotopy, Wydawnictwo Lekarskie PZWL, Warszawa (54, 377).

8. J.Frisell, L.Bergqvist, G.Liljegren, M.Thorn , S.Damm ,H. Rydman , R. Danielsson,2001, Sentinel node in breastcancer – a Swedish pilot study of 75 patients. Eur J Surg, 167; (179–183).

9. S.Vidal-Sicart, F.Pons, S.Puig, M.Ortega, A.Vilalta, F.Martin, R.Rull, JM Palou, T. Castel, 2003, Identification of the sentinel lymph node in patients with malignant-melanoma: whatare the reasons for mistakes. Eur J Nucl Med. Mol Imaging, 30; (362–366).

10.C.Altgassen, H. Hertel, A. Brandstädt et al., 2008, Multicentervalidationstudy of the sentinel lymph node concept in cervicalcancer: AGO Study Group. J ClinOncol, 26; (2943-51).