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Search details

Can bone marrow be used for biochemical markers as an alternative to venous blood when venous access cannot be established. Is there an established reference range for electrolyte results obtained from bone marrow?

Resources searched

NHS Evidence; National Library for Health; TRIP database; MEDLINE; EMBASE; Google Scholar

**Database search terms:** “bone marrow”; BONE MARROW; biochemistry; exp BIOCHEMISTRY; “biochemical marker”; biological marker”; “haematological marker”; exp BIOLOGICAL MARKERS; “diagnostic test”; DIAGNOSTIC TESTS, ROUTINE; “intraosseous infusion device”; INFUSIONS, INTRAOSSEOUS; venous; access; blood; “venous access”; sodium; calcium; potassium; “intravenous access”; intraosseous; intra-osseous; “vascular access”; venepuncture; venipuncture; cannulation; catheter*; BLOOD SPECIMEN COLLECTION; PHLEBOTOMY; exp CATHETERIZATION; collapse; fail*; diagnost*; exp DIAGNOSIS; VEIN PUNCTURE; CANNULATION; INTRAVENOUS CATHETER; INTRAVASCULAR CATHETER; “reference value”; REFERENCE VALUES; BONE MARROW EXAMINATION; electrolytes; exp ELECTROLYTES; examination

Search steps: 259

**Google search string:** "bone marrow" (venous OR vein) blood "venous access" electrolyte "biochemical marker"

Summary

After an extensive search, I have not managed to find any reference values for biochemical markers from bone marrow extracts. Lost of research on intraosseous infusion, but very little on extraction and I have not managed to find any research on whether bone marrow can be used as an alternative to venous blood in cases where venous access cannot be established. I have included articles which cover bone marrow sampling in case these give
you reference data for specific electrolytes or biochemical markers for specific diseases.

### Guidelines

None found.

### Evidence based reviews

None found.

### Published research

1. **Mn2+ regulates myeloma cell adhesion differently than the proadhesive cytokines HGF, IGF-1, and SDF-1alpha.**

   **Author(s):** Slordahl TS, Hov H, Holt RU, Baykov V, Syversen T, Sundan A, Waage A, Borset M

   **Citation:** European Journal of Haematology, December 2008, vol./is. 81/6(437-47), 0902-4441;1600-0609 (2008 Dec)

   **Publication Date:** December 2008

   **Abstract:** Adhesion of multiple myeloma (MM) cells in the bone marrow (BM) is important for the growth and survival of the myeloma cells. Very late antigen-4 (VLA-4) is one of the main adhesion receptors that mediate MM cell binding to fibronectin (FN). In this study we have examined the effect of divalent cations on adhesion of MM cells to FN, and compared this type of adhesion with the adhesion induced by the cytokines HGF, IGF-1 and SDF-1alpha. Mn(2+) induced adhesion in all cell lines tested. Cytokine- and Mn(2+)-induced VLA-4-mediated adhesion were different in many respects, including binding specificity, adhesion kinetics and the activation state of VLA-4. To study a potential role of divalent cations in vivo, we measured the concentrations of divalent cations in BM plasma from 14 MM patients. We also found that Mn(2+)-mediated adhesion to FN activated the MAPK pathway, indicating that the interaction of MM-cells with FN mediated by Mn(2+) could play a critical role for growth and proliferation. In conclusion, this study shows a potential important role of divalent cations in MM cell biology and supports earlier studies pointing to activated VLA-4 as a key for homing of MM cells to the BM.

   **Source:** MEDLINE

2. **Blood sampling through intraosseous needles: Time to stop?**

   **Author(s):** Nicoll S.J.B., Rochester S.J.

   **Citation:** Resuscitation, October 2008, vol./is. 79/1(168), 0300-9572 (October 2008)

   **Publication Date:** October 2008

   **Source:** EMBASE

3. **Reply to Letter: Blood sampling through intraosseous needles: Time to stop?**

   **Author(s):** Salter R., Maconochie I.

   **Citation:** Resuscitation, October 2008, vol./is. 79/1(168), 0300-9572 (October 2008)

   **Publication Date:** October 2008

   **Source:** EMBASE

4. **CXCR5 may be involved in the attraction of human metastatic neuroblastoma cells to the bone marrow.**

   **Author(s):** Airoladi I, Cocco C, Morandi F, Prigione I, Pistoia V

   **Citation:** Cancer Immunology, Immunotherapy, April 2008, vol./is. 57/4(541-8), 0340-7004;0340-7004 (2008 Apr)
Abstract: INTRODUCTION: Up-regulation of some chemokine receptors on tumor cells is associated with increased metastatic potential. In this respect, limited information is available on chemokine receptor in human neuroblastoma (NB). OBJECTS: Purpose of the study was to identify chemokines/chemokine receptors involved in bone marrow (BM) localization of metastatic NB cells in view of the development of targeted therapeutic strategies. CD45- metastatic NB cells were isolated from the BM of six patients by immunomagnetic bead manipulation. Some experiments were carried out using a panel of human neuroblastoma cell lines (GI-ME-N, GI-LI-N, LAN-5, HTLA-230, SH-SY-5Y and IMR-32). Immunophenotypic analyses were performed by flow cytometry. Cell migration assays were carried out using transwell systems. Calcium ion mobilization, chemokine receptor internalization and cell proliferation were investigated by flow cytometry. RESULTS: In all BM samples, CXCR5 was expressed by the majority of primary neuroblasts and mediated their chemotaxis in response to CXCL13. Primary metastatic NB cells from all BM samples expressed CXCR6, but were not attracted by soluble CXCL16. Studies performed with two CXCR6+ NB cell lines showed that the mechanism whereby neuroblasts did not migrate to CXCL16 was likely related to defective calcium ion mobilization. CONCLUSIONS: CXCR5 is the first chemokine receptor so far identified able to attract in vitro primary metastatic NB cells. CXCR6 may be involved in retention of metastatic neuroblasts in the BM through interaction with CXCL16 expressing stromal cells in the absence of signal transduction.

Source: MEDLINE


Author(s): Markovic O, Marisavljevic D, Cemerikic V, Vidovic A, Perunicic M, Todorovic M, Elezovic I, Colovic M

Citation: Medical Oncology, 2008, vol./is. 25/4(451-7), 1357-0560;1357-0560 (2008)

Abstract: The conflicting data are reported on the clinical significance of VEGF deregulation and intensity of angiogenesis in multiple myeloma. The aim of this study was to evaluate the incidence and prognostic significance of VEGF expression and microvessel density (MVD) in multiple myeloma, as well as the relationship of their expression with selected clinical data, histological features, and proliferative activity of myeloma cells. We analyzed bone marrow biopsy specimens obtained from 59 patients with newly diagnosed multiple myeloma. Expression of VEGF and MVD was analyzed using standard immunohistochemical method (antibodies against VEGF and CD34, respectively) on B5-fixed and routinely processed paraffin-embedded bone marrow specimens. MVD was estimated by counting the number of microvessels in three "hot spots" at 400x magnification. VEGF immunoreactivity was estimated on the basis of intensity and percentage of positive plasma cells. VEGF was expressed in 47/59 (79.7%) specimens. There was no significant correlation between VEGF overexpression and age, clinical stage, the extent of osteolytic lesions, type of monoclonal protein, hemoglobin concentration, platelet count, serum concentration of creatinine, calcium, and albumins, the extent of bone marrow infiltration, histological grade, and proliferative activity index (measured with Ki-67 immunoreactivity). No significant difference was observed regarding the overall survival between VEGF-positive and VEGF-negative patients (29 vs. 34 months, P = 0.8). Median MVD was 15, ranging from 1 to 89 microvessels per three "hot spots". There was significant correlation between MVD and histological grade, the extent of bone marrow infiltration, and proliferative activity. Significant difference was observed regarding the overall survival between patients with low MVD (<15) and patients with high MVD (> or = 15) (46 vs. 22 months, P = 0.009; univariate analysis). The results of this study did not reveal clinical significance of VEGF overexpression in multiple myeloma. On the contrary, the extent of bone marrow angiogenesis is an indicator of biological potency of malignant clone and a predictor of poor survival in newly diagnosed myeloma.

Source: MEDLINE

6. How we process trephine biopsy specimens: epoxy resin embedded bone marrow biopsies.
Author(s): Krenacs T, Bagdi E, Stelkovics E, Bereczki L, Krenacs L
Citation: Journal of Clinical Pathology, September 2005, vol./is. 58/9(897-903), 0021-9746;0021-9746 (2005 Sep)
Publication Date: September 2005
Abstract: Improved cytomorphology of semithin resin sections over paraffin wax embedded sections may be important in diagnostic haematopathology. However, resin embedding can make immunohistochemical antigen detection or DNA isolation for clonal gene rearrangement assays difficult. This review describes the processing of bone marrow biopsies using buffered formaldehyde based fixation and epoxy resin embedding, with or without EDTA decalcification. Traditional semithin resin sections are completely rehydrated after etching in home made sodium methoxide solution. Resin elimination allows high resolution staining of tissue components with common histological stains. Efficient antigen retrieval and the Envision-HRP system permit the immunohistological detection of many antigens of diagnostic relevance, with retention of high quality cytomorphology. Furthermore, DNA can be extracted for clonality analysis. The technique can be completed within a similar time period to that of paraffin wax processing with only approximately 30% increase in cost. This technique has been used for diagnosis in over 4000 bone marrow biopsies over the past 14 years. By meeting traditional and contemporary demands on the haematopathologist, it offers a powerful alternative to paraffin wax processing for diagnosis and research.
Source: MEDLINE
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7. [Immunohistochemical and molecular characterization of systemic mastocytoses]. [German] Immunhistologische und molekulare Charakterisierung systemischer Mastozytosen.
Author(s): Sotlar K
Citation: Verhandlungen der Deutschen Gesellschaft fur Pathologie, 2005, vol./is. 89/(245-53), 0070-4113;0070-4113 (2005)
Publication Date: 2005
Abstract: The WHO has published an updated classification of mastocytosis and the criteria for the diagnosis of systemic mastocytosis (SM). These include one major criterion, compact mast cell (MC) infiltrates in extracutaneous tissues, and four minor criteria, i.e. cytomorphologic atypia with spindling of MC (>25 %), detection of the activating somatic c-kit mutation D816 V in MC, aberrant expression of CD2 and/or CD25 on MC, and an elevated serum tryptase level (>20 ng/ml). Systemic mastocytosis is diagnosed when the major plus one minor, or three minor criteria are fulfilled. In the present study, we have established methods for the detection of CD25 and the c-kit mutation D816V in paraffin-embedded bone marrow trephine biopsy specimen of 57 patients with various subtypes of mastocytoses and 239 controls. While MCs in almost all patients with SM (55/57) expressed CD25, only 2/239 of the control samples contained CD25-positive MCs. With newly designed molecular pathological methods, c-kit codon 816 mutations were detected by "peptide nucleic acid" (PNA)-mediated PCR-clamping and/or analysis of microdissected MC in 52/57 cases with SM. All cases with detectable c-kit mutations also contained CD25-positive MC. The c-kit mutation D816 V was also detected in microdissected cells of associated hematologic neoplasias in 6/15 cases. With the methods established for the investigation of paraffine-embedded tissues, the pathologist plays a central role in the diagnosis of SM.
Source: MEDLINE

Author(s): Gupta R, Jain P, Deo SV, Sharma A

Citation: American Journal of Clinical Pathology, March 2004, vol./is. 121/3(368-72), 0002-9173;0002-9173 (2004 Mar)

Publication Date: March 2004

Abstract: Recent reports suggest that CD5+ B cells constitute up to 47% of the total B cells in normal peripheral blood (PB), a finding that would restrict the sensitivity of the CD5/CD19 flow cytometric assay for minimal residual disease (MRD) analysis in chronic lymphocytic leukemia (CLL). We studied 40 normal samples (PB, 20; bone marrow [BM], 20) using CD5-fluorescein isothiocyanate (FITC)/CD19-phycoerythrin (PE) immunostaining to evaluate the reference range of CD5+ B cells. The mean percentage of CD5+ B cells per total number of B cells was 12.2% (range, 3.6%-23.9%) in PB and 11.7% (range, 4.4%-19.5%) in BM. On serial dilution, this assay could detect 1 CLL cell in 1,000 leukocytes (sensitivity, 0.1%). A distinct "bright" CD5+ B-cell subpopulation, consistent with a CLL-like-phenotype, was observed in 3 samples. Our results suggest that the CD5-FITC/CD19-PE assay has a clinically useful sensitivity for MRD analysis in CLL. The usefulness of this assay as a screening tool to identify the earliest stage of indolent CLL needs further study.

Source: MEDLINE


Author(s): Markovic O, Marisavljevic D, Cemerikic V, Suvajdzic N, Milic N, Colovic M

Citation: Medical Oncology, 2004, vol./is. 21/1(73-80), 1357-0560;1357-0560 (2004)

Publication Date: 2004

Abstract: Conflicting data are reported on the clinical significance of cyclin D1 deregulation in multiple myeloma. The aim of this study was to evaluate the incidence and prognostic significance of cyclin D1 expression and p53 mutations in multiple myeloma, as well as the relationship of their expression with selected clinical data, histological features, and proliferative activity of myeloma cells. We analyzed bone marrow biopsy specimens obtained from 59 patients with newly diagnosed multiple myeloma. Expression of cyclin D1 and p53 was analyzed using standard immunohistochemical method of B5-fixed and routinely processed paraffin-embedded bone marrow specimens. Cyclin D1 was overexpressed in 14/59 (27%) and p53 in 5/59 (8.5%) specimens. There was no significant correlation between cyclin D1 overexpression and age, gender, clinical stage (Durie-Salmon classification), extent of osteolytic lesions, type of monoclonal protein, hemoglobin concentration, platelet count, serum concentration of creatinine, calcium, C-reactive protein, and beta2-microglobulin. No association was observed between the expression of cyclin D1 and the extent of bone marrow infiltration, histological grade, proliferative activity index (measured with Ki-67 immunoreactivity) and response to therapy. No significant difference was observed regarding overall survival between cyclin D1 positive and cyclin D1 negative patients (29 vs 36 mo, p = 0.76). Results of this study did not revealed prognostic significance of cyclin D1 overexpression in multiple myeloma. Mutations of p53 gene are rare events in myeloma, suggesting their limited role in the pathogenesis of the disease.

Source: MEDLINE

10. Expression of neuronal markers in differentiated marrow stromal cells and CD133+ stem-like cells.

Author(s): Padovan CS, Jahn K, Birnbaum T, Reich P, Sostak P, Strupp M, Straube A

Citation: Cell Transplantation, 2003, vol./is. 12/8(839-48), 0963-6897;0963-6897 (2003)

Publication Date: 2003

Abstract: Bone marrow stromal cells, which normally give rise to bone, cartilage, adipose tissue, and hematopoiesis-supporting cells, have been shown to differentiate in vitro and in vivo into neural-like cells. In this study, we examined the expression of neuronal and glial markers in human marrow stromal cells under culture conditions appropriate for neural stem cells, and compared the unsorted cell population to bone marrow CD133+ stem-like
cells using immunofluorescence, Western blot, and functional patch-clamp analysis. Overall, the expression of the early neuronal marker beta3-tubulin was most pronounced in the presence of DMEM/F12 and neurotrophin 3 (NT3) or brain-derived neurotrophic factor (BDNF), when marrow stromal cells were cultured onto fibronectin. Electrophysiological examination, however, could not show fast sodium currents or functional neurotransmitter receptors in differentiated marrow stromal cells. CD133+ mesenchymal stem-like cells, but not CD34+/CD133- cells, generally showed a higher expression of neuronal markers than did unsorted marrow stromal cells, and differentiated CD133+ cells more resembled neuron-like cells.

Source: MEDLINE

11. Diagnostic and prognostic value of bone marrow angiogenesis and megakaryocyte c-Mpl expression in essential thrombocythemia.

Author(s): Mesa RA, Hanson CA, Li CY, Yoon SY, Rajkumar SV, Schroeder G, Tefferi A
Citation: Blood, June 2002, vol./is. 99/11(4131-7), 0006-4971;0006-4971 (2002 Jun 1)
Publication Date: June 2002
Abstract: The lack of diagnostic certainty in some patients makes it difficult to distinguish between primary and secondary forms of thrombocytopathy. To augment current diagnostic studies for thrombocytopathy, we retrospectively evaluated clinical records and bone marrow trephine specimens of 183 patients with thrombocytopathy-164 with essential thrombocythemia (ET), 19 with reactive thrombocytopathy (RT)-for bone marrow angiogenesis, bone marrow megakaryocyte c-Mpl staining, and morphologic evidence of megakaryocyte proliferation. Angiogenesis was increased in patients with ET compared with healthy controls (P <.0001) and patients with RT (P =.006). In addition, an increase in angiogenesis was associated with certain disease features such as splenomegaly (P =.004) and reticulin fibrosis (P =.005). Decreased megakaryocyte c-Mpl staining was observed in a heterogeneous pattern in ET compared with healthy controls (P <.0001) and RT (P <.0001). Histologic stratifying criteria incorporating increased angiogenesis, decreased megakaryocyte c-Mpl expression, and marked megakaryocyte proliferation in the bone marrow was highly sensitive (97%) and specific (95%) for distinguishing ET from RT (P <.0001). However, with the current duration of follow-up available on the patients, none of the histologic features evaluated have yet demonstrated prognostic value for subsequent clinical course, vascular events, or survival.

Source: MEDLINE

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Author(s): Abali H, Haznedaroğlu IC, Goker H, Celik I, Ozatlı D, Koray Z, Caglar M
Citation: Hematology, April 2002, vol./is. 7/2(75-82), 1024-5332;1024-5332 (2002 Apr)
Publication Date: April 2002
Abstract: Until last the decade, the renin-angiotensin system (RAS) was considered as a circulating endocrine system. It is now known that there are local RASs in many tissues. It has also recently been hypothesized that there exists a local bone marrow (BM) RAS with paracrine/autocrine pathobiological functions. The aim of this study was to detect BM and peripheral blood levels of the essential RAS components in normal and leukemic hematopoiesis. Concentrations of renin and angiotensin-converting enzyme (ACE) were assayed in BM aspirates and in simultaneously drawn peripheral blood samples of 16 pre-chemotherapy leukemic and 10 post-treatment megaloblastic anemia patients with normal blood counts, as controls. In the leukemia group, the ACE concentration was found to be significantly higher in the BM (38+/−6.2 U/l) than in the peripheral blood (29.5+/−5.3 U/l), (p=0.029). In the leukemia group, although the BM renin concentration was higher than the
peripheral blood levels (21.3+/−8.3 vs. 18.6+/−6.2 U/l), this difference was not statistically significant (p=0.196). In the control group, mean BM renin levels were insignificantly lower than in the peripheral blood (8.6+/−3 vs. 12.1+/−4.6 pg/ml) (p=0.059). In the leukemia group, serum ACE levels positively correlated with BM and peripheral blood blast percentages (p<0.05). Serum LDH level (p<0.01), BM blast (p<0.05) and peripheral blast percentages (p<0.01) were inversely correlated with serum potassium in the leukemia group. The results of this study can be considered as the preliminary evidence supporting the hypothesis of the presence of a local BM RAS. Further, molecular biologic and immunohistochemical studies are needed to shed light on this important subject. A better understanding of the interrelationships of RAS and hematopoiesis will bring new insights into the pathobiology and even novel therapies for such neoplastic diseases.

Source: MEDLINE

13. Can blood taken from intraosseous cannulations be used for blood analysis?

Author(s): Hurren JS

Citation: Burns, December 2000, vol./is. 26/8(727-30), 0305-4179;0305-4179 (2000 Dec)

Publication Date: December 2000

Abstract: Intraosseous infusion is increasingly finding application for venous access to infuse drugs and fluids in paediatric resuscitation including burns. The aim of this study was to determine the feasibility of using blood samples taken from the bone marrow cavity for routine blood analysis. In paediatric resuscitation where alternative venous access is not available this could prove valuable. Peripheral venous blood samples were compared with blood obtained from the bone marrow cavity in patients undergoing bone marrow aspiration for the investigation of possible medical pathology. Haemoglobin, haematocrit, sodium, urea, creatinine, and calcium levels values were sufficiently similar to be clinically useful. The potassium level was elevated in most bone marrow samples and the difference from peripheral venous samples variable. Great caution should be exercised in their interpretation. Glucose levels should also be interpreted with care. In conclusion, blood samples obtained intraosseously may give a useful guide to peripheral blood levels of some haematological and biochemical variables. This is potentially useful where a peripheral venous sample cannot be obtained. The values must be interpreted with care. Whether these findings can be extended to paediatric patients who are not haemodynamically stable has not been assessed.

Source: MEDLINE

14. Elevated soluble MUC1 levels and decreased anti-MUC1 antibody levels in patients with multiple myeloma.


Citation: Blood, November 2000, vol./is. 96/9(3147-53), 0006-4971;0006-4971 (2000 Nov 1)

Publication Date: November 2000

Abstract: Soluble MUC1 (sMUC1) levels are elevated in many MUC1(+) cancers. We and others have shown that MUC1 is expressed on multiple myeloma (MM) plasma cells and B cells. In this study, we measured sMUC1 levels in bone marrow (BM) plasma from 71 MM patients and 21 healthy donors (HDs), and in peripheral blood (PB) plasma from 42 MM patients and 13 HDs using an immunoassay that detects the CA27.29 epitope of MUC1. sMUC1 levels were found to be significantly greater (mean 31.76 U/mL, range 5.69 to 142.48 U/mL) in MM patient BM plasma versus HD BM plasma (mean 9.68 U/mL, range 0.65 to 39.83 U/mL) (P < .001). Importantly, BM plasma sMUC1 levels were related to tumor burden because sMUC1 levels were significantly higher for MM patients with active disease (34.62 U/mL, range 5.69 to 142.48 U/mL) versus MM patients with minimal residual disease (16.16 U/mL, range 5.7 to 56.68 U/mL) (P = .0026). sMUC1 levels were also elevated in the PB plasma of MM patients (32.79 U/mL, range 4.15 to 148.84 U/mL) versus HDs (18.47 U/mL, range 8.84 to 42.49) (P = .0052). Lastly, circulating immunoglobulin M (IgM) and IgG antibodies to MUC1 were measured in 114 MM patients
and 31 HDs, because natural antibodies to MUC1 have been detected in patients with other MUC1-bearing malignancies. These studies demonstrated lower levels of circulating IgM (P <.001) and IgG (P = .078) antibodies to MUC1 in MM patients compared with HDs. Our data therefore show that in MM patients, sMUC1 levels are elevated and correlate with disease burden, whereas anti-MUC1 antibody levels are decreased.

Source: MEDLINE

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15. Evidence of increased angiogenesis in patients with acute myeloid leukemia.
Author(s): Hussong JW, Rodgers GM, Shami PJ
Citation: Blood, January 2000, vol./is. 95/1(309-13), 0006-4971;0006-4971 (2000 Jan 1)
Publication Date: January 2000
Abstract: Angiogenesis plays a key role in solid tumor growth. The purpose of this work was to study angiogenesis in acute myeloid leukemia (AML). We stained bone marrow samples from 20 adult patients with untreated AML and 20 normal controls using endothelial cell markers (ULEX-E and von Willebrand factor [vWF]). The number of vessels per millimeter length of bone marrow core biopsy specimen was scored by light microscopy. Using ULEX-E staining, AML marrows had (average +/- SEM) 8.3 +/- 3.6 vessels/mm (range, 3.7-19.3), whereas normal marrows had 4.3 +/- 1.8 vessels/mm (range, 1.6-7.9). A similar difference was noted using vWF staining (8.6 +/- 3.0 vessels/mm vs 4.9 +/- 2.2 vessels/mm in AML vs normal bone marrows, respectively). The differences between the numbers of vessels/mm in AML and normal marrows were highly significant (P <.0001 for both ULEX-E and vWF staining). When analyzed by FAB category, there was no difference in the average number of vessels/mm among the different subgroups of AML. Using reverse transcriptase polymerase chain reaction, we observed that the HL-60 and U937 human AML cell lines and 4 of 4 freshly isolated AML cells from untreated patients expressed mRNA for vascular endothelial growth factor (VEGF). Both cell lines as well as all fresh AML isolates tested expressed VEGF protein. Basic fibroblast growth factor was expressed only in HL-60 cells and in only 3 of 4 fresh AML samples. These observations suggest that angiogenesis may play a role in the pathogenesis of AML. Inhibition of angiogenesis could constitute a novel strategy for the treatment of AML. (Blood. 2000;95:309-313).

Source: MEDLINE

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Available in fulltext at Highwire Press
Available in fulltext at Ovid

Author(s): Cohen AM, Garin-Chesa P, Hanson M, Weyhrauch K, Kemeny N, Fong Y, Paty P, Welt S, Old L
Citation: Diseases of the Colon & Rectum, September 1998, vol./is. 41/9(1112-5), 0012-3706;0012-3706 (1998 Sep)
Publication Date: September 1998
Abstract: PURPOSE: The purpose of this study was to assess the immunocytochemical status of bone marrow aspirates from patients with clinically isolated hepatic metastases to test the hypothesis that such findings would allow improved patient selection for liver-directed treatment. METHODS: All patients had biopsy-proven or presumed colorectal cancer metastatic to the liver and were scheduled for an operative procedure for hepatic
resection or for hepatic artery catheter and chemotherapy pump implant. Immunocytochemical analysis of bone marrow aspirate smears was performed with a panel of monoclonal antibodies directed toward cytokeratins, Lewis Y antigen and A-33 colorectal epitopes. RESULTS: Data from 80 patients indicated that bone marrow reactivity was present in 9.5 percent of those with resectable hepatic metastases and in 34 percent of those not resected (P = 0.03). No single monoclonal antibody or combination produced better discrimination. CONCLUSIONS: Presence or absence of presumed occult colorectal cancer cells in the bone marrow of patients with isolated hepatic metastases is biologically interesting, but not useful in selecting or altering patient management.

Source: MEDLINE


Author(s): Shih LY, Lee CT, See LC, Ou YC, Dunn P, Wang PN, Kuo MC, Wu JH

Citation: European Journal of Clinical Investigation, July 1998, vol./is. 28/7(569-76), 0014-2972;0014-2972 (1998 Jul)

Publication Date: July 1998

Abstract: BACKGROUND: We assessed the in vitro culture growth of erythroid progenitors [burst forming unit-erythroid (BFU-E)] and serum erythropoietin (EPO) levels in different groups of polycythaemia to determine the discriminative power in differential diagnosis of polycythaemia. METHODS: We used the methylcellulose culture technique to study the growth of endogenous erythroid colonies (EECs) and EPO-dependent BFU-E from bone marrow (BM) and/or peripheral blood (PB) cells from 40 patients with polycythaemia vera (PV), 13 with secondary polycythaemia (SP), 19 with pure erythrocytosis (PE), 19 with pure erythrocytosis (PE), five with PE-PV evolution later (PE-PV), and 12 with relative polycythaemia (RP). The serum EPO levels were measured by radioimmunoassay before treatment in 47 patients, 23 SP patients, 19 PE patients, five PE-PV patients and 16 RP patients, as well as after treatment in 38 PV patients, five PE-PV patients and 12 PE patients. RESULTS: The results of the erythroid progenitor culture assay showed that the numbers of EPO-dependent BFU-E in BM did not differ significantly among groups. The PB BFU-E were significantly higher in PV than in SP or PE, and no statistical difference were found among patients with SP, PE and RP. There was a correlation between BM BFU-E and PB BFU-E in the individual PV and PE patients. EECs were present in all BM and PB cultures of untreated and phlebotomy-treated PV and PE-PV patients, but were absent in 6 of 17 PV patients who had received cytotoxic therapy. EECs were not found in SP, PE and RP. PB could substitute for BM in the EEC or the BFU-E assay. Both pretreatment and post-treatment serum EPO levels of PV and PE-PV were similar, which were significantly lower than SP, PE or RP. The serum EPO levels in treated PV or PE-PV patients who had normal haematocrit values were not significantly different from those in untreated patients. In contrast, the phlebotomy-treated PE patients had significantly higher serum EPO values than untreated PE patients. In the differentiation between PV and PE, the sensitivity, specificity, positive predictive value and negative predictive value of post-treatment serum EPO levels at a cut-off level of < or = 9 UL-1 were 74%, 92% and 52% respectively. The discriminative power of post-phlebotomy serum EPO levels was even higher with a positive predictive value of 80% and negative predictive value of 92% for the prediction of PV evolution in patients with pure erythrocytosis of unknown origin. CONCLUSION: The present study showed that apart from EEC assay, the post-phlebotomy serum EPO level was a sensitive and specific parameter in the differential diagnosis of polycythaemia, in particular for the identification of PV among patients with unclassifiable polycythaemia.

Source: MEDLINE

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18. Are laboratory values in bone marrow aspirate predictable for venous blood in paediatric patients?

Author(s): Ummenhofer W, Frei FJ, Urwyler A, Drewe J

Citation: Resuscitation, March 1994, vol./is. 27/2(123-8), 0300-9572;0300-9572 (1994)
Abstract: In an emergency situation, early laboratory results are important, but often difficult to obtain. If venous access cannot be established, the intraosseous route may be used as an alternative. This study investigated the predictive value of bone marrow aspirate in performing laboratory studies. Thirty children underwent general anaesthesia for bone marrow aspiration (iliac crest) for oncologic or haematologic reasons. The aspirate and a peripheral venous blood sample, which was obtained simultaneously, were subjected to different laboratory tests and the results were compared by means of confidence interval analyses of the individual ratios of venous/bone marrow values. Based on these analyses, a high predictability of bone marrow values were found for haemoglobin, sodium, chloride, glucose, bilirubin, urea, creatinine, pH, and standard bicarbonate. Moderate, but clinically useful predictability was found for haematocrit, potassium, and total protein, while bone marrow values of alkaline phosphatase, aspartate aminotransferase, alanine aminotransferase, PCO2, PO2, thrombocytes and leukocytes were systematically different from values in venous blood. Our data suggest that the intraosseous route is not only an important emergency alternative to intravenous access for administering fluids and drugs but may also serve as a reliable alternative for obtaining initial diagnostic laboratory studies when intravascular access is not obtainable.

Source: MEDLINE