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PLASMA CROSSLINKED FIBRIN DEGRADATION PRODUCTS FRACTION D (D-DIMER) IN PATIENTS UNDERGOING ELECTIVE MAJOR ABDOMINAL SURGERY AND IN HEALTHY VOLUNTEERS. O. Hauch (1), H. Nerstrøm (1), T.R. Kølle (1), L.N. Jørgensen (1), P. Wille-Jørgensen (1), H. Neerstrand (2). Department of surgery, Kommunehospitalet, 1399 K Copenhagen, Denmark (1) and Novo research laboratory, Novo Industri A/S, 2880 Bagsvaerd, Denmark (2).

An increased plasma level of D-dimer has been suggested as an indicator of postoperative thromboembolism (TE). We studied the D-dimer level in patients undergoing major elective abdominal surgery and in healthy volunteers to evaluate a possible value of D-dimer as a screening test for TE. 18 patients and 5 healthy volunteers were studied. The patients received low molecular weight heparin (Logiparin TM) subcutaneously once daily for 7 days. The 125 I-fibrinogen uptake test (FUT) was done in all patients. Blood samples were taken preoperatively, postoperatively and on the postoperative day 1, 3, 4, 5 and 6. The volunteers had blood samples taken before and 4 hours after subcutaneous Logiparin injection. D-dimer was assayed by enzyme-immunoassay (Boehringer Mannheim, Elisa D-dimer, Cat.no. 998117). Results are given as median with 95% confidence limits in brackets.

One patient developed deep venous thrombosis verified by phlebography. Two patients had abnormal FUT but normal phlebography. The plasma level for D-dimer in the 15 patients with normal FUT was 500 ng/ml (300-800) preoperatively. The D-dimer level increased postoperatively to 1700 ng/ml (900-3300) ($p < 0.001$). The following days the D-dimer level increased steadily to 4800 ng/ml (2600-6800) 6 days postoperatively. The plasma level of D-dimer in the volunteers were less than 110 ng/ml both before and after injection of Logiparin. The plasma level of D-dimer in the patient with deep venous thrombosis and the 2 patients with abnormal FUT were within the range of the patients with normal FUT. The postoperative D-dimer level was as high as that reported in patients with diagnosed thromboembolism. In conclusion, the D-dimer test does not seem to be a potential screening test for postoperative thromboembolism.

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A COMPARISON OF D-DIMER AND SERUM FIBRINOGEN/FIBRIN DEGRADATION PRODUCT LEVELS (F.D.P.'s) IN THE INVESTIGATION OF HYPERCOAGULABLE STATES.

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D-Dimer assays measure specific breakdown products of crosslinked fibrin whereas FDP assays are not specific for these products. We have, therefore, measured D-Dimer levels (MabCo Dimer Test) semi-quantitatively in patients with clinical and laboratory evidence of disseminated intravascular coagulation, acute and chronic liver disease, acute leukaemia at presentation and acute venous thrombosis at diagnosis. We have also measured D-Dimer in the 3rd trimester of normal pregnancy and in pregnancies with complications. We compared these levels with F.D.P. levels measured by the Thrombo-Wellcotest. Patients with liver disease comprised mainly cirrhosis and acute viral hepatitis; those with venous thrombosis had this diagnosis confirmed by venography. Pregnancy complications included mainly pre-eclampsia, ante-partum haemorrhage and intra-uterine foetal death. D-Dimer levels were elevated (200ng/ml) in all 31 patients with D.I.C., in 34 of 40 with liver disease, in 13 of 16 with acute leukaemia, in all 10 patients with D.V.T., in 9 of 16 normal pregnancies and in 29 of 39 complicated pregnancies. Using a rank correlation method, there was correlation between D-Dimer and F.D.P. levels (Normal 8ug/ml) in the following groups of patients as follows (r is the correlation coefficient, levels of significance are shown in brackets):

D.I.C. $r=0.72(0.2\%)$, liver disease $r=0.56(0.2\%)$, acute leukaemia $r=0.72(0.2\%)$, D.V.T. $r=0.83(1\%)$ and complicated pregnancy $r=0.42(1\%)$. There was no correlation between D-Dimer and F.D.P. levels in normal pregnancy. Very rarely were D-Dimer levels elevated when F.D.P. levels were normal and vice-versa. We conclude that a close relationship does exist between D-Dimer and F.D.P. levels in the clinical conditions that we have studied. We note the high incidence of elevated D-Dimer levels and the close correlation with F.D.P. levels in patients with liver disease and the high incidence of elevated D-Dimer levels suggesting increased activity of the coagulation system in patients with acute leukaemia.

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POSTOPERATIVE CHANGES IN HEMOSTASIS, ANALYZED BY SERIAL DETERMINATION OF FIBRINOPEPTIDES AND D DIMER. J. Kambayashi, J.H. Kang, T. Tanaka, T. Tsujinaka, M. Sakon, T. Mori. Hematology Research Unit, The Second Dept. of Surgery, Osaka Univ. Medical Sch., Osaka, Japan

It is generally believed that hypercoagulable state occurs after surgery, followed by hyperfibrinolytic state. Though a considerable number of studies on the postoperative changes in hemostasis have been reported, the results are inconclusive, as it is difficult to detect in vivo activation of coagulation and fibrinolysis by conventional laboratory tests. Thereby, attempts were made to elucidate the changes by serial determination of fibrinopeptide A (FPA), fibrinopeptide B (Beta 15-42 (BB) & D dimer in our surgical cases ([A]-27 hepatic resections, [B]-27 gastric resections, [C]-4 probe laparotomies). FPA & BB were determined by radioimmunoassay and D dimer was assayed by agglutination of Latex beads coated with monoclonal antibody. FPA was elevated 1h after surgery in [A] (25.5±7.6ng/ml) and [B] (16.4±3.3) and it returned to normal range (4.2±2.1) by postoperative day 1 (POD 1). No such change was noted in [C]. BB in [A] was elevated (46.2±10.6ng/ml) 1h after surgery and the value remained high until POD 14. In [B], BB was likewise elevated at 1h (50.9±7.7) and it gradually decreased to 26.0±4.8 by POD 2. Then, it again increased to 36.8±5.1 and remained high until POD 10. The value in [C] was normal (6.8±2.4) throughout the period. FDP was moderately increased (10-20ug/ml) until POD 14 & 7 in [A] & [B]. Regardless of the increased level of BB, the amount of D dimer was within normal range (<200ng/ml) until POD 1 & 3 in [A] & [B]. Thereafter, it gradually increased and reached above 1,000ng/ml between POD 7 and 10 in both groups. From these observations, the following conclusions were obtained; (1) Unexpectedly, postoperative hypercoagulable state was transient and of low magnitude. (2) On the other hand, significant fibrinolysis was observed immediately after surgery and it continued over 10 days. The early phase (up to POD 3) is likely to be primary fibrinolysis as it was not accompanied by formation of D dimer. The late phase is considered to be secondary fibrinolysis as D dimer was also elevated. (3) Regardless of the different surgical procedures, these changes were basically similar between [A] and [B], though the intensity of the changes was different. Therefore, the postoperative changes in hemostasis presented herein may be the general physiological response against at least abdominal surgery.

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IS D. DIMERS DOSAGE USEFUL FOR DIAGNOSIS OF PRETHROMBOTIC STATE DURING POST-OPERATIVE PERIOD ? A. Le Querrec, A. Derlon, M. Thomas. Laboratoire d'Hématologie, C.H.U. Côte de Nacre, 14040 CAEN FRANCE.

62 patients were at random blindly given either Kabi 2165 or commercial heparin for 6 days in prophylaxis of post-operative DVT after abdominal surgery. The radiofibrinogen uptake test (FRUT) was performed every two days during 6 days. D. Dimers quantification was performed with an enzyme-linked immunosorbent assay using monoclonal antibodies : ELISA (Diagnostica Stago). D. Dimers quantification allowed us to share out patients amongst two groups :

- 1) Mild abdominal surgery,
- 2) Oncologic surgery.

	J-1	J1	J3	J6
1	0.39 ± 0.3	1.01 ± 0.58	1.37 ± 0.67	1.7 ± 0.7
2	1.56 ± 1.5	2.17 ± 1.20	2.50 ± 1.40	3.0 ± 1.4

In both groups, no difference was observed according to the treatment ($p > 0.5$) We saw a significant rise of D. Dimers from D-1 to D6 ($p < 10^{-6}$) in both groups, with significantly upper values in group 2 ($p < 0.01$).

Among 62 patients, 3 had positive RFUT. There was no significant difference between D. Dimers values of these 3 patients and D. Dimers values of the 59 patients with negative RFUT. Thus, the rise of D. Dimers during post-operative period was not associated with DVT in these 59 patients.