The Peritoneal Fluid Cytology of the Adult Female Rhesus Monkey

Peritoneal fluid cytologic specimens obtained from different mammalian species provide basic data to study the cellular response of serous abdominal fluid in health and disease[1]. In normal women pelvic peritoneal fluid appears to be in a state of equilibrium in which cell renewal and degeneration may reflect the presence of pathology so that cul-de-sac cytologic aspirations may be used to detect early ovarian cancer[2-4]. Normal cytology relates to age, menstrual cycle[5,6], estrous cycle[7], inflammation[8,9], hormones[10-12] and pregnancy[13,14]. The effect of human pregnancy on abdominal fluid cytology was found to be quite similar to that observed by us in mice. In the present study we analyzed the % distribution of abdominal fluid in adult female Rhesus monkeys to extend our species information on peritoneal fluid as well as to see how the cellular content compared with women so that we might consider this sub-human primate as a test animal for studying problems in obstetrics and gynecology.

Method. Six adult female Rhesus monkeys were quarantined for 6 weeks and vaginally smeared for several months to determine the menstrual cycle of each animal. Based upon the cycle of each monkey we elected to obtain peritoneal fluid at a time near ovulation when fluid was considered most assessable. Consideration was given to the effect of the menstrual cycle on the peritoneal fluid cell content. Each monkey was anesthetized with 20 mg/kg i.m. ketamine and 2% Halothane before laparotomy and a 2.5 ml syringe was used to directly aspirate peritoneal fluid from the abdominal cavity. The aspirated specimen was spread on an albumin-coated slide and was stained by PAPANICOLAOU's procedure[15]. 200 consecutive cells were randomly counted and grouped as mesothelial cells, polymorphonuclear leukocytes, histiocytes, lymphocytes, monocytes, mast cells and bare nuclei. Bare nuclei are light to dark staining nuclei without cytoplasm. The procedure of randomly counting a fixed number of cells rather than counting the number of cells in an absolute fluid volume eliminates the extreme variation resulting from counting cells per unit volume even though in the present study rather adequate fluid amounts were obtained. In previous work with women we aspirated at times only a few drops since laparotomy was generally not employed. We calculated the standard error for each mean cell count and by dividing the average cell count by 2, the % distribution of each individual mean cell count was obtained.

Results. The % distribution of peritoneal fluid cells of adult female Rhesus monkeys listed in the Table seems to indicate that the cellular content varies somewhat from women. The mesothelial cell and histiocyte proportions appear similar whereas polymorphonuclear leukocyte and lymphocyte distributions were different. The values for erythrocytes and squamous cells (contaminants) are not listed in the Table for women. Consideration must be given to a number of variables which enter into the comparison such as methods of aspiration – cul-de-sac – taps in women versus direct aspiration in monkeys, anesthesia, surgical trauma and others. Also, the Rhesus monkey specimens were always obtained around ovulation when fluid was most available to us. However, we are aware of the influence of the menstrual cycle, hormones and ovulation on the abdominal cell content. Despite these variables the % distributions of the most prominent cell – the mesothelial cell – were virtually identical suggesting that possibly the renewal – degeneration of this cell was similar in both women and Rhesus female monkeys. The Rhesus monkey can be used to study the many influences on the morphology of the mesothelial cell. From this work we cannot conclude about the feasibility of using the Rhesus monkey as the model test animal for studying peritoneal fluid cytology but it does improve our knowledge on species differences and aids in our understanding the cellular response of abdominal serous fluid in health and disease.

Conclusions. The % distribution of peritoneal fluid cells of adult female Rhesus monkeys was recorded from cytologic fluid specimens obtained directly from the abdominal cavity by laparotomy and compared with previous data obtained from women.

Résumé. Le % de distribution des cellules de fluide péritonéal d'une femelle adulte de singe rhésus fut enregistré dans des échantillons de fluide cytologique extraits par la paratomie. Les données sond comparées à celles qui ont obtenues précédemment chez la femme.

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The normal peritoneal fluid cellular content of adult female Rhesus monkeys as compared to women

	Rhesus monkeys	Menstrual women[14]
No. of subjects	6	34
Body weight (kg)	4.6 ± 0.2[a]	—
Cell type	% Distribution of cells	
Mesothelial cells	54.0 ± 1.5	51.8 ± 3.2
Polymorphonuclear leukocytes	22.4 ± 1.3	11.9 ± 2.2
Histiocytes	10.2 ± 0.7	8.8 ± 1.1
Lymphocytes	4.8 ± 0.8	23.0 ± 1.9
Monocytes	7.6 ± 0.5	—
Mast cells	0.8 ± 0.2	—
Bare nuclei	1.1 ± 0.2	—

[a] ± Standard error.

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