添加魚油之全靜脈營養對胃切除大鼠細胞性免疫反應之影響

Effects of parenterally infused n-3 fatty acid on cellular immunity in rats with gastrectomy

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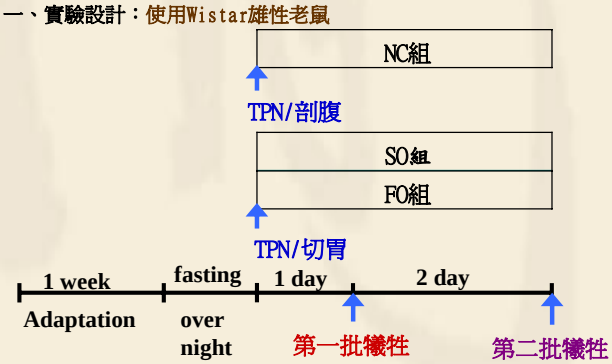
前言

胃癌是國人因癌症死亡的十大死因之一，而胃切除是治癒此病的唯一方法，對於胃切除的病人，手術前後常有營養不良的情形，因此給予全靜脈營養補充是主要維持其營養狀況的方法之一。有研究顯示，手術壓力會使Th1、Th2型細胞分佈傾向於Th2型的細胞分佈，而減弱細胞性免疫反應的能力。其他的研究顯示，在身體受到創傷時，prostaglandin (PG) E_2生成量會增加，造成lymphocyte的功能降低和Th1 cytokine之生成量減少。

魚油含有豐富的n-3脂肪酸(EPA、DHA)，許多臨床試驗顯示出魚油的補充有抗動脈硬化及免疫調節的功用。n-3脂肪酸可能藉由調控PGE_2來調節Th2 型細胞激素的分泌。先前研究顯示，在罹患疾病時，補充魚油可使IL-2 和IFN-γ分泌量增加。然而，Peterson等人指出，細胞實驗中EPA會抑制lymphocyte增生，在動物實驗中則會降低細胞性免疫反應。亦有實驗顯示，給予健康的人食用魚油，會使得體內之IL-2分泌量下降。 此外，動物實驗中若減少n-6/n-3 多元不飽和脂肪酸比例，會使細胞性免疫反應明顯降低，故補充魚油對免疫的功用結果並不一致。因此本研究想探討在胃切除老鼠的全靜脈營養液中，添加富含n-3脂肪酸之魚油脂肪乳劑，對於淋巴球亞群的分佈及淋巴球Th1/Th2型細胞激素的表現和巨噬細胞吞噬作用的影響。

材料與方法

一、實驗設計：使用Wistar雄性老鼠



二、TPN solution ：實驗組一組給予一般黃豆油脂肪乳劑(SO)，一組則給予黃豆油、魚油各半之脂肪乳劑(FO)，控制組(NC)配方與SO組相同，三組爲等熱量、等氮量，營養素分佈比例相同，只有脂肪乳劑不同，醣類：脂肪：蛋白質比例爲60 ： 20 ： 20 。

三 、分析項目：取全血，分析淋巴球亞群的分佈，和IL-4、IFN-γ在T淋巴球中的分佈，收集腹腔沖洗液分析巨噬細胞吞噬能力。

統計方法

數據以 mean ± SD 表示，進行 two-way ANOVA with Duncan's test，$p < 0.05$表示有統計上的差異。

結果

Table 1. Distribution of blood CD45Ra+, CD3, CD4 and CD8 lymphocyte (%) among the control and experimental groups 1 and 3 days after operation

	CD45Ra+	CD3	CD4	CD8	CD4/CD8
Day1					
NC	14.8±2.0	47.0±2.5	44.6±11.1	10.6±2.1	2.52±0.53
SO	15.3±6.4	40.4±9.8	35.5±4.1	12.9±1.7	2.81±0.58
FO	22.7±4.8*	38.4±6.9	42.0±4.4†	12.0±2.3	3.57±0.60*
Day3					
NC	12.7±7.2*	39.7±16.3	35.5±14.0	13.8±2.3	49±0.7
SO	25.6±4.4	38.8±12.6	34.2±2.9	15.9±2.3	2.21±0.52
FO	24.4±5.3	40.5±4.0	41.2±4.0†	13.0±1.8†	3.23±0.60*

*Significantly different from the other 2 groups on the same post-op day.
†Significantly different from the SO group on the same post-op day.

Table 2. Distributions of intra-lymphocyte IFN-γ and IL-4 expressions (%) among the control and experimental groups 1 and 3 days after operation

	IFN-γ	IL-4
Day1		
NC	19.8± 5.6*	1.63±1.18
SO	24.5± 5.2	1.50±0.43
FO	24.7±3.7	1.07±0.24
Day3		
NC	19.3±2.0*	1.01±0.90
SO	31.9±4.1†	1.04±0.21
FO	38.1±3.2†‡	0.87±0.05

*Significantly different from the SO and FO groups at the same post-op day.
†Significantly different from the corresponding group at post-op day 1.
‡Significantly different from the SO group on post-op day 3.

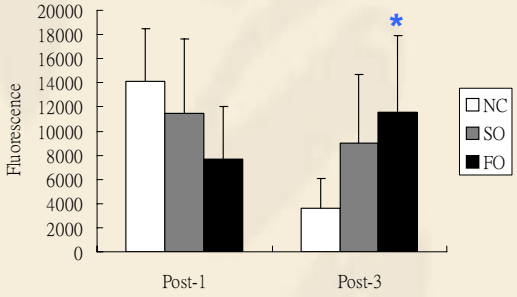


Fig. 1. Phagocytic activity of peritoneal macrophages 1 d and 3 d after sham operation or gastrectomy. *The phagocytic activities of FO group were significant higher than those of the control group ($p < 0.05$), whereas there was no difference between the SO and the control groups on postoperative d 3.

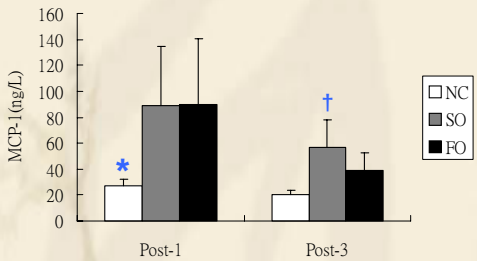


Fig. 2. Monocyte chemotactic protein (MCP)-1 levels in peritoneal lavage fluid 1 d and 3 d after sham operation or gastrectomy. *Significant difference from SO and FO groups at the same postoperative day. †Significant Difference from FO group at postoperative day 3.

結論

本實驗結果顯示，在全靜脈營養液中添加魚油可促進胃切除大鼠腹腔巨噬細胞之吞噬能力及降低MCP-1的製造，並且也可促進Th1細胞激素interferon-γ之分泌，並增進CD4分佈及CD4/CD8比例，應有助於恢復術後之細胞性免疫反應。

參考資料

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