**Supplemental Table. Characteristics of included studies**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Country** | **Randomization** | **Allocation concealment** | **Blinding** | **Duration** | **Intervention** | **Comparison** | **Bilirubin** | **Liver enzymes** | **Cholestasis rate at the end of follow up** |
| Demirel (2012)([101](#_ENREF_101)) | Turkey | Computer generated randomization | NR | NR | 14 days | OO/SO (n=20) | SO (n=29) | Levels NR | Levels NR | NR |
| Deshpande (2009)([94](#_ENREF_94)) | Australia | Computer-generated code | NR | Yes, no details | 5 days | OO/SO (n=25) | SO (n=25) | Mean values ± SD for day 6 | Mean values ± SD for ALT and GGT for day 6 | NR |
| Koksal (2011)([96](#_ENREF_96)) | Turkey | Computer-generated code | NR | Yes | 7 days | OO/SO (n=32) | SO  (n=32) | Total bilirubin levels reported for days 0 and 7 – levels reported as mean ± standard error | ALT, ALT, GGT and AP reported for days 0 and 7 – levels reported as mean ± standard error | NR |
| Webb (2008)([102](#_ENREF_102)) | Australia | Computer-generated code | NR | Yes | 5 days | OO/SO (n=39) | SO (n=39) | Levels NR | Levels NR | NR |
| Wang (2015) ([100](#_ENREF_100)) | China | Sealed opaque randomization  envelope | NR | Yes | Mean 27 vs. 23 days (at least 14 days) | OO/SO (n=52) | SO (n=51) | Levels reported for days 0, 7, 14 - mean values ± SD provided separately from authors | ALT, ALT, GGT and AP reported for days 0, 7, 14 – mean values ± SD provided separately from authors | 2 patients in OO/SO vs. 2 in SO group |
| Gobel (2003)([95](#_ENREF_95)) | Germany | NR | NR | Yes, no details | 7 days | OO/SO (n=24) | SO (n=21) | Mean values ± standard error for days 0 and 8 | Mean values ± standard error for ALT, ALT, GGT and AP reported for days 0 and 8 | NR |
| Rayyan (2012)([97](#_ENREF_97)) | Belgium | Software randomization list | NR | Yes | 7-14 days | SMOF (n=26) | SO (n=27) | Mean values ± SD for days 0 and 8 | Mean values ± SD for ALT and GGT for days 0 and 8 | NR |
| D’Ascenzo (2014)([93](#_ENREF_93)) | Italy | Sealed envelope system | NR | Yes | 7 days | SMOF 2.5 g/kg/day (n=21)  SMOF 3.5 g/kg/day (n=18) | SO 2.5 g/kgday (n=22)  SO 3.5 g/kg/day (n=19) | Mean values ± SD for day 7 | Levels NR | 1 patient in SMOF2.5vs. 0 in SMOF3.5vs. 1 in SO2.5 vs. 3 patients in SO3.5 |
| Skouroliakou (2010)([98](#_ENREF_98)) | Greece | Computer generated randomization list? Unclear, 🡪 seald envelopes? | NR | Yes | >14 days until discharge (in SMOF group mean 41 days in SO group mean 28.8 days) | SMOF (n=19 included; 5 excluded) | SO (n=19 included; 1 excluded ) | Mean values ± SD for days 0, 14 and discharge day | Levels NR | NR |
| Tomsits (2010)([99](#_ENREF_99)) | Hungary | NR | NR | Yes | 7-14 days (mean SMOF 11 days vs. SO group 10 days) | SMOF (n=30) | SO (n=30) | Mean values ± SD for days 0 and end of the study | Mean values for ALT, ALP and GGT ± SD for days 0 and end of the study | NR |
| Beken (2014) ([92](#_ENREF_92)) | Turkey | Sealed envelopes | Not clear, sealed envelopes were used | Yes | Median 14 (10-28) days | SMOF (n=49) | SO (n=40) | Mean values ± SD for days 0 and end of the study | Mean values for ALT, GGT ± SD for days 0 and end of the study | 2 patients in SMOF vs. 2 in SO group |
| Vlaardingerbroek (2014)([56](#_ENREF_56)) | Netherlands | Computer generated block randomization | Sealed opaque randomization  envelope | yes | Median 11 days in SMOF group (9-14); SO group 12 days (9-16) | SMOF (n=49) | SO (n=49) | Mean values ± SD for day 7 | Mean values for AST and ALT ± SD for day 7 | 2 patients in SMOF vs. 2 patients in SO |
| D’Ascenzo (2011) ([106](#_ENREF_106)) | Italy | NR | NR | NR | Maximal 18 days | SMF (n=24) | MCT/SO (n=24) | Mean values ± SD for days 0 and 7 | Levels NR | NR |
| Pawlik (2013) ([103](#_ENREF_103)) | Poland | NR | NR | Not clear | OO/SO+FO mean 21.7 (5-55) days vs. SO mean 22.3 (7-91) days | OO/SO+FO  (n=60) | SO (n=70) | Levels NR | Levels NR | 20 patients in SO vs. 3 in OF group |
| Rubin (1991) ([104](#_ENREF_104)) | Israel | NR | NR | Yes, no details | 3 days | MCT/SO (n=9) | SO (n=9) | Levels NR | Levels NR | NR |
| Rubin (1995)([105](#_ENREF_105)) | Israel | NR | NR | Yes, no details | 6 days | 1) PFE 450 (n=16)  2) MCT/SO (n=15) | SO (n=18) | Levels NR | Levels NR | NR |
| Savini (2013)([58](#_ENREF_58)) | Italy | Sealed enveloped | NR | Yes | ≈20 days; mean SO 21.6 vs. MCT/SO 21.7 vs. SMF 20.9 vs. OO/SO 21.6 vs. SMOF 19 days | 1) MCT/SO based (n=30)  2) SMF (n=30)  3) OO/SO (n=30)  4) SMOF (n=30) | 5) SO (n=30) | Mean values ± SD for  6 weeks | Mean values for AST, ALT, ALP and GGT ± SD for 6 weeks | SO 0 vs. MCT/SO 1 vs. SMF 1 vs. OO/SO 0 vs. SMOF 1 patient |
| Lai (2000)([108](#_ENREF_108)) | China | NR | NR | NR | 7 days | 10% MCT/SO (n=20) | 10% SO (n=20) | Levels NR | Levels NR | NR |
| Hartman (2009)([109](#_ENREF_109)) | Israel | Computer generated random numbers | NR | Yes | ≈ 19 days (assessment on day 14) | OO/SO (n=15) | MCT/SO (n=13) | Mean values ± SD for days 0 and 14 | Mean values for AST, ALT, ALP and GGT ± SD for  Days 0 and 14 | NR |
| Goulet (1999)  ([24](#_ENREF_24)) | France | Not clear | NR | Yes | 2 months | OO/SO (n=9) | SO (n=9) | Mean values ± SD for days 0 and 60 | Mean values ± SD for AST, ALT, ALP and GGT for days 0 and 60 | NR |
| Goulet (2010) ([110](#_ENREF_110)) | France | Computer generated block randomization | Sealed envelopes | Yes | 29 days | SMOF (n=15) | SO (n=13) | Mean values ± SD for days 0 and 29 | Mean values ± SD for AST, ALT, ALP and GGT for days 0 and 29 | NR |
| Lam (2014) ([111](#_ENREF_111)) | China | Not clear | Not clear | Yes | FO group 40 (18-90) days vs. SO group 74 (23-82) | FO (n=9) | SO  (n=7) | Rate of conjugated bilirubin increase (μmol/l per week, median (IQR)) | Rate of ALT increase (U/l per week, median (IQR)) | Not significance between groups in the time to resolution of cholestasis |
| Nehra (2014) ([107](#_ENREF_107)) | USA | Computer generated randomization | NR | Yes | FO group 38 (32-58) days vs. SO group 36.5 (29-76) | FO (n=9) | SO  (n=10) | Levels for conjugated bilirubin at baseline and after 4 weeks (mg/dl; median, IQR) | Median (IQR) at baseline and after 4 weeks for ALT, AST, ALP and GGT | Very low rate for both groups; NS difference in the incidence |

ALT - alanine transaminase; ALP - Alkaline phosphatase; AST - aspartate transaminase; GGT - γ-glutamyltransferase; FO – fish oil; MCT/SO – mixture of MCT and soya bean oil; NR – not reported; OO/SO – mixture of olive oil and soya bean oil; PFE 450 - paediatric fat emulsion; SO – soya bean oil; PN – parenetral nutrition; SMF – mixture of soya bean oil, MCT and fish oil; SMOF – multicomponent fish oil containing (mixture of olive oil, soya bean oil and fish oil);